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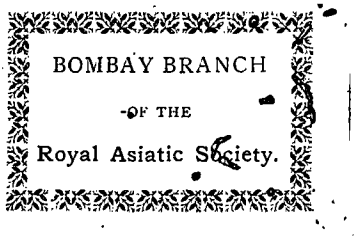

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EAST INDIA (SANITARY MEASURES)

REPORT

ON

SANITARY MEASURES IN INDIA

IN

1906-1907

VOL. XL.

Presented to both Houses of Parliament by Command of His Majesty.

LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By DARLING & SON, Ltd., 34-40, Bacon Street, E.

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Report on Sanitary Measures in India, 1906-07

Errata.

Page 3. In line 25 *for* 1930 *read* 1000.

„ 12. In line 10 from bottom *for* 8 *read* 18.

„ 20. *For* Medical Board *read* M. B.

„ 101. In line 8 *for* £ 0,671 *read* £ 10,671.

„ 114. Against Table XVIII *for* 329 *read* 129.

„ 135. Table XXX. Against July, under United Provinces, *for* 2,45 *read* 2,465.

„ 136. Table XXXI. Against Total 1905, for Native States under January, *for* 1,496 *read* 14,965.

REPORT.

The following Report on Sanitary Measures in India during the year 1906 is prepared for presentation to Parliament. It deals with the health of European and Native troops, of prisoners in jails, and of the general population; it also deals with vaccination, medical institutions, including hospitals and dispensaries, medical schools, and lunatic asylums, and with sanitation.

I.—EUROPEAN ARMY.

Sickness and mortality in 1906.

Sickness and mortality in 1906.—The year 1906 was an unhealthy one for all classes of people in India and the rates of admission to hospital, of mortality, and of invaliding, among European troops were all higher than those of 1905. The constantly sick rate, however, fell from 52 to 51 per 1,000. On an average strength of 70,272, of which 51 per cent. were men under 25 years of age and 21 per cent. were men with less than one year's service in India, the admissions to hospital were in the ratio of 871 per 1,000, against 834 in 1905, while the death rate rose from 10·05 to 10·43 and the invaliding rate from 21·24 to 28·36 per 1,000. The following statement shows the sickness and mortality among European troops in the three Commands and the Secunderabad and Burma Divisions during 1906 and 1905:—

Commands.		Average strength.	Ratio per 1,000 of average strength.				
			Admissions.	Constantly sick.	Deaths.	Invaliding.	Total loss.
Northern Command ...	1906	18,699	848	48	8·45	20	28
	1905	18,274	800	49	9·08	20	29
Western " ...	1906	18,885	936	51	12·92	42	55
	1905	19,537	896	55	11·62	29	41
Eastern " ...	1906	18,850	864	54	10·56	25	36
	1905	18,983	820	54	10·00	19	30
Secunderabad Division ...	1906	8,520	927	61	9·62	32	42
	1905	8,389	813	62	8·46	18	26
Burma " ...	1906	3,853	898	53	9·86	19	29
	1905	3,812	971	54	9·71	15	25
INDIA ...	1906	70,272	871	51	10·43	28	38
	1905	71,343	834	52	10·05	21	31

It will be seen from the above statement that the lowest constantly sick and death rates were recorded among the troops in the Northern Command and that the highest admission, death and invaliding rates were recorded among troops in the Western Command. In regard to mortality there was an improvement in the Northern and Eastern Commands only, and the total loss by invaliding and death was greater than in the previous year in all except the Northern Command. As in 1905 the health of the European troops in the Rawalpindi and Lahore Divisions was better than in the other Divisions during 1906.

The increase in sickness was due chiefly to a rise in the number of admissions on account of ague; this disease, venereal diseases and simple continued fever were the chief causes of sickness during the year. Ague caused an admission rate of 176 per 1,000 against 111 in 1905, venereal diseases 117 per 1,000 against 154 and simple continued fever 56 per 1,000 against 48. Forty per cent. of the total sickness resulted from these three causes. There was increased sickness from ague, remittent fever and simple continued fever. Enteric fever and hepatic abscess were, as usual, the chief causes of mortality, the death rate from the former being 3·19 per 1,000 as against 2·99 in 1905 and from the latter 1·52 as against 1·18. Thirty-one per cent. of the total deaths were due to enteric fever and 15 per cent. to hepatic abscess. The mortality from each of the chief diseases with the exception of heat-stroke, pneumonia and tubercle of the lungs, was higher than in 1905. The chief causes of invaliding were debility, ague, syphilis, valvular disease of the heart, enteric fever, and disordered action of the heart; these accounting altogether for nearly one-half of the total invaliding. The

number of men sent home on account of syphilis rose from 75 in 1905 to 120 in 1906 and on account of enteric fever from 52 to 115, but the number invalided for tubercle of the lungs fell from 116 to 92. The admission rate of European troops was nearly 19 per cent. greater than that of native troops, while their constantly sick rate was more than twice as high. The European death rate was 10·43 and the native 6·57 per mille.

The following table shows the sickness and mortality among the European troops according to geographical groups:—

Groups.	Average strength.	Ratio per 1,000 of average strength.		
		Admissions.	Constantly sick.	Deaths.
Burma Coast and Bay Islands ...	1,375	866	46	6·55
Burma Inland	1,609	943	56	14·92
Bengal and Orissa	1,775	1,120	77	9·58
Gangetic Plain and Chutia Nagpur ...	6,871	788	52	12·08
Upper Sub-Himalaya	13,989	886	53	9·58
North-Western Frontier, Indus Valley and North Western Rajputana.	4,975	1,252	56	10·25
South-Eastern Rajputana, Central India and Gujarat.	6,249	1,027	55	15·68
Deccan	10,188	756	49	13·74
Western Coast	1,444	817	57	6·93
Southern India	3,802	1,016	59	6·84
Hill Stations	11,235	675	41	6·14
Hill Convalescent Depôts and Sanitaria...	3,592	807	58	10·58
INDIA ...	76,272	872	51	10·43

Of the above 12 groups the admission rate recorded in six was higher than that for the European Army as a whole and in five groups the death rate was higher. The most unhealthy group, judged by the admission rate, was the North-Western Frontier and Indus Valley with a rate of 1,252 per 1,000. Of the stations with a strength of over 1,000 the highest death rates were recorded in Jhansi (28·09) and Mhow (16·01).

Fevers.—Ague ranked first in the list of causes of admission to hospital. Throughout Northern India the autumn months were exceptionally malarious. The admission rate from intermittent fever rose from 111 per 1,000 in 1905 to 176 and the death rate from ·11 to ·23. The admission rate among troops in the Northern Command rose from 70 per 1,000 in 1905 to 226 per 1,000, in the Western from 163 to 250, and in the Eastern from 113 to 132. The Peshawar and Mhow Divisions were chiefly affected. Ague accounted for 20 per cent. of the sickness from all causes as against 13 per cent. in 1905. The more frequent use of the microscope in diagnosis has resulted in a great increase in the admission rate from simple continued fever. Anti-mosquito operations, the systematic use of quinine, and the removal of regiments severely attacked by malaria into camps situated at some distance from their barracks were among the chief measures adopted to check malaria during the year.

The admissions for *enteric fever* were 1,095 or 15·6 per 1,000 of strength, as against 1,146 or 16·1 in 1905, but the deaths were 224 against 213, or a death rate of 3·19 against 2·99. The constantly sick rate was 224·1 against 220·5. The average duration of a case was 75 days against 70 in 1905, and the total loss of service was 81,800 days against 80,482. The disease was more prevalent and fatal in the Eastern and Western Commands than in the Northern. Among the stations with an average strength of over 1,000 a death rate of 14·98 was recorded in Jhansi, 9·39 in Mhow and 9·15 in Agra. Among soldiers from 20 to 25 years of age the death rate was 4·64 per 1,000 against 4·32 in 1905, while among men between 25 and 30 and from 30 to 35 the mortality was 2·08 and 1·64 per 1,000, respectively. Of the 224 deaths from enteric fever 39 per cent. occurred among men between 20 and 25, and 17 per cent. among men between 25 and 30. Among men of less than one year's residence in India the death rate was 3·88 per 1,000, among men between one and two years' service 4·03, and among men between two and three years' service 2·77. Patients are now kept in hospital longer than formerly and the early diagnosis of cases and the isolation of convalescents until they cease to

excrete the bacilli in their dejecta are the most important prophylactic measures now aimed at. An investigation of the causes and prophylaxis of enteric fever among European troops in India was commenced at the Central Research Institute in India in March 1906 and the results already obtained are of great importance.

Venereal diseases.—Venereal diseases were the cause of 13 per cent. of the total sickness during 1906, and of 7 per cent. of invaliding in the European Army. The admission rate per 1,000 was 117 as against 154 in 1905. In all probability the noteworthy reduction in the rates during recent years is due to a real reduction in the amount of venereal disease among European troops, for in 1906 the procedure with regard to the statistical record of the diseases under this heading was the same as in 1905, and the reduction is evident in the statistics of invaliding and death which are not affected by changes in the method of record. A potent factor in bringing about a reduction in the rates from venereal diseases is the great improvement which has taken place in the methods and duration of treatment. Of the Commands the highest admission rate, *viz.*, 127, was in the Eastern Command, the rate in the Western Command being 101 and in the Northern 76. The Burma Division suffered most, with a rate of 191 per 1,000 and the Peshawar Division least (64·5). The rates at some stations were high, *e.g.*, Fort William (325), Mallapuram (285), Deolali (253), Saugor (252·5), and Madras (236). The number of men constantly sick in hospital from these diseases was 865 against 1,089 in the previous year; and the average stay of a case in hospital was about 38 days. The total loss of service thus involved amounted to 315,648 days. The deaths from these diseases numbered 11 (or ·16 per mille) and the invalidings 131 (1·86 per mille), against 13 and 83 respectively in 1905.

Abscess of the liver.—From hepatic abscess there were 107 deaths, giving a ratio of 1·52 per 1,000 of strength, against 84 deaths and 1·18 per 1,030 in 1905. The mortality was greatest among troops in the Western Command.

Other diseases.—Cholera was considerably more prevalent, the number of cases recorded being 72 and the number of deaths 46 against 10 cases and 9 deaths in 1905 and 16 cases and 11 deaths in 1904.

Small-pox caused 87 cases with 4 deaths, against 99 cases with one death in 1905 and 49 cases with 4 deaths in 1904. There has been an increase in the prevalence of this disease among European troops in India during recent years, coincident with a great increase in the numbers of men who at the yearly examinations are found to have no satisfactory marks or record showing that they have been vaccinated.

The admission rate from dysentery rose from 13·4 per mille in 1905 to 15·2 and the death rate from ·46 to ·53. As in the previous year the disease was most prevalent and fatal among troops in the Western Command.

There were 17 cases of plague and 2 deaths, against 13 cases and 4 deaths in 1905.

Influenza caused an admission rate of 11·4 per mille as against 14·2 in 1905. Peshawar, Agra and Cawnpore were the stations chiefly affected.

The admission rate from tubercle of the lungs fell from 2·1 per mille in 1905 to 1·6 and the death rate from ·28 to ·17.

Invaliding.—The loss by invaliding during 1906 amounted to 1,993 men, equal to 28·36 per 1,000 of strength, against 1,508 or 21·24 in 1905. The invaliding rates ranged from 42 in the Western Command to 19 in the Burma Division. A striking feature of the statistics is the large increase in the numbers invalided for enteric fever and for debility. Of the 115 invalided from enteric fever 110 were under 30 years of age and of the 255 invalided from debility 178 were under 30 years of age. The number of invalidings for syphilis was 120 and for tubercle of the lungs 92. As regards the influence of age and length of residence in India upon invalidings 48 per cent. of the total number invalided were under 25 years of age and 83 per cent. were under 30, while 27 per cent. were of less than two years' service in India and 66 per cent. were of less than five years.

II.—NATIVE ARMY.

Sickness and mortality in 1906.—The health of the Native Army during 1906 was very good. The admission rate was somewhat higher than in 1905, but the constantly-sick rate and the death rate were the lowest on record. The invaliding rate was considerably lower than in 1905.

The ratios of sickness and mortality during 1906 and the previous year were as follows:—

Command.		Average strength.	Ratio per 1,000 of average strength.		
			Admissions.	Constantly sick.	Deaths.
Northern Command ...	1906	40,535	791	25	6·19
	1905	36,696	652	26	12·92
Western ,, ...	1906	34,972	743	24	8·09
	1905	33,932	602	23	6·60
Eastern ,, ...	1906	21,918	647	25	6·93
	1905	21,823	572	23	6·42
Secunderabad Division ...	1906	10,603	524	20	7·73
	1905	11,794	466	19	5·77
Burma ...	1906	5,310	644	26	4·14
	1905	4,793	614	26	6·47
INDIA ,, ...	1906	127,853	684	23	6·57
	1905	123,434	607	23	8·09

In 1906 the admission and constantly sick rates were highest in the Northern Command, but the death rate was highest in the Western Command, where cholera was prevalent.

The following statement gives the principal statistics of the Native Army, arranged in geographical groups, for 1906:—

Groups.	Average strength.	Ratio per 1,000 of average strength.		
		Admissions.	Constantly sick.	Deaths.
Burma Coast and Bay Islands ...	1,349	485	18	4·45
Burma Inland	2,836	674	26	3·53
Assam	954	775	25	2·10
Bengal and Orissa	1,816	876	33	9·91
Gangetic Plain and Chutia Nagpur ...	6,209	564	18	7·25
Upper Sub-Himalaya	20,842	600	22	6·19
North-Western Frontier, Indus Valley and North-Western Rajputana.	19,224	938	27	5·20
South-Eastern Rajputana, Central India and Gujarat.	13,243	767	23	8·08
Deccan	16,591	579	21	9·22
Western Coast	1,783	804	25	12·90
Southern India	4,282	605	20	6·31
Hill Stations	22,403	735	28	6·83
INDIA	127,853	684	23	6·57

The chief causes of sickness were ague, dysentery, simple continued fever, respiratory diseases other than pneumonia, venereal diseases, and anæmia and debility, while pneumonia, tubercle of the lungs and cholera were the chief causes of mortality.

In seven of the 12 groups the constantly sick rate was higher than that for the whole Native Army, and in 6 the mortality was greater. The highest mortality was recorded in the Western Coast group.

Out of 40 stations with an average strength of over 1,000 in 1906 there were three in which sickness and mortality were heavy. At Dera Ismail Khan the admission rate

was 1,795 per mille and the death rate 5·80, the chief causes of the great amount of sickness being malaria, dysentery and respiratory diseases. At Abbottabad the admission rate was 1,219 per mille and the death rate 7·67, intermittent and simple continued fevers being the chief causes of sickness. At Mhow the admission and death rates were 810 and 16·67 per mille, the high death rate being due chiefly to the mortality from plague. In 1906, as in previous years, comparatively low hill regions near the foot of mountain ranges were found to be least favourable to the health of the troops.

The Native troops suffered less than the European troops from influenza, cholera, small-pox, enteric fever, intermittent fever, simple continued fever, diarrhœa, hepatic affections and venereal diseases, but more from the other chief causes of sickness.

Intermittent fever.—The chief cause of sickness was, as usual, ague, which contributed 38 per cent. of the total admissions. The admission rate was ·262 per mille as against 171 in 1905. The rate in all the Commands was higher than in the previous year, the increase being greatest in the Northern Command. October and November were the months of greatest prevalence.

Pneumonia.—Pneumonia was, as usual, the chief cause of death in the Native Army and contributed 23·7 per cent. of the total deaths, the death rate being 1·56 per 1,000 of average strength, against 1·90 in 1905. The death rate from this disease among the Native soldiers was more than five times as great as that among European troops. The disease was most prevalent during the year among troops located in the Hill Stations group and most fatal in Group X—Western Coast.

Other diseases.—There was a considerable increase in the prevalence of cholera, 94 cases and 62 deaths being reported as against 11 cases and 7 deaths in 1905. The admission and death ratios from enteric fever were only 1·0 and ·27 per mille respectively, as against 15·6 and 3·19 for European troops. Remittent fever accounted for 5·1 per cent. of the total mortality. The admission rate from simple continued fever was 29·6 per 1,000 against 14·3 in 1905 and 6·7 in 1904. There were 147 admissions to hospital and 83 deaths from plague as against 79 admissions and 46 deaths in 1905. The admission rate from tubercle of the lungs (2·5 per 1,000) was the lowest since 1896, but the death rate rose from ·50 per 1,000 in 1905 to ·52. The prevalence of the disease among Gurkhas was, as usual, much greater than among other races in the Native Army. Dysentery was rather more prevalent and fatal than during 1905, the admission rate rising from 32·5 per mille to 37·1 and the death rate from ·18 to ·20. Venereal diseases caused an admission rate of only 16·2 per 1,000; they were more than seven times as prevalent among European troops as among Native troops. Their prevalence in the Native Army has decreased steadily during recent years though not as rapidly as among European troops. Gurkhas, as usual, suffered most.

Invaliding.—The chief causes of invaliding were tubercle of the lungs, debility, rheumatism, venereal diseases and ague. The invaliding rate was 7·05 per 1,000 against 9·02 in 1905, the respective numbers discharged being 902 in 1906 and 1,113 in 1905.

III.—GENERAL POPULATION.

Meteorology.—The chief meteorological conditions of the year 1906 were the persistency of the cold weather longer than usual, the excessive rainfall, especially in northern India, during February and March, the delay in the setting in of the monsoon rainfall, and, at the end of the year, the excessive rainfall in many parts of the country.

The year was very unhealthy and the mortality from all the principal diseases except plague was considerably higher than in 1905. Cholera was severe throughout southern India, and all over northern India the autumn was exceptionally malarious. The number of deaths recorded as due to plague was, however, only about one-third of the number recorded in 1905, and from all causes taken together there were recorded in British territory 265,441 fewer deaths than in that year.

Registration of Vital Statistics.—There are defects in the registration nearly everywhere; in some places the defects are very serious. Improvement in registration is, however, being steadily effected, and in some of the provinces the errors in the numbers of births and deaths registered are comparatively small, although the causes of death are everywhere, except in a few of the greater cities, incorrectly reported. The experiment of employing a professional agency in a selected area to ascertain the actual causes of the deaths registered was begun on the 1st of August 1906 in a selected area in Bengal.

Births and Deaths.—The mean birth rate of the population under registration, 223,511,195, was 37·80 per 1,000 against 39·13 in 1905, the birth rates in the larger provinces ranging from 51·72 per 1,000 of population in the Central Provinces and Berar to 26·10 in Coorg. The populations among whom deaths are registered aggregate 226,125,682 according to the census of 1901, and the mean death rate in 1906 was 34·73 per 1,000, against 35·96 in 1905, the death rates ranging in the larger provinces from 43·47 in the Central Provinces and Berar to 26·22 in Upper Burma. Male infants died at the rate of 228·30 per 1,000 born and female infants at the rate of 217·52, compared with rates of 231·11 and 217·72 in 1905.

Chief diseases.—Of the chief diseases cholera was present in every province except the North-West Frontier Province, and was severe in Madras (death-rate 3·9), Bengal (3·81), Eastern Bengal and Assam (3·63), the Central Provinces and Berar (3·26), the United Provinces (3·14) and Bombay (2·50). The total mortality from cholera rose from 441,786 to 690,519. Small-pox was more widespread than in 1905 and the death rates were upwards of ·5 per 1,000 in seven provinces, the highest being 1·42 in Lower Burma, 1·30 in Coorg, ·83 in the Central Provinces and Berar, and ·8 in Madras. The mortality for India generally was 109,583 against 70,962 in 1905. From fevers the number of deaths was higher than in 1905 by 35,187, the total being 4,452,842. The mortality was greater than in the previous year in all provinces except Bengal and Eastern Bengal and Assam. Fever is credited with many deaths really due to other causes and in the year under notice 56 per cent. of the deaths from all causes were registered under this heading. It is estimated that the mortality from malarial fever is not more than between 20 and 30 per cent. of the mortality recorded under the heading fever. The mortality from dysentery and diarrhœa rose from 264,124 to 298,117, the death rates being higher than in 1905 in all provinces except the United Provinces. The death rates from respiratory diseases were highest in Bombay (3·28) and the Punjab (2·84). Plague was much less prevalent than in 1905, the total number of deaths in India as a whole being 356,721 as against 1,069,140 in 1905. The decrease in mortality was common to all the greater provinces being especially large in the United Provinces, the Punjab, and Bengal. Coorg was the only province entirely free from the disease. The mean plague death rate for the British provinces was 1·33 per 1,000 against 4·17 in 1905. The Plague Commission which has been working continuously in India for two years under the direction of an Advisory Committee in England has solved many very important problems in connection with the etiology and mode of spread of the disease. It is now established that plague is carried from rat to rat by means of the rat-flea and all the evidence at present available is in favour of the correctness of the flea theory in respect of man. The deaths from the chief diseases and from all causes in the several British provinces in 1906 were as follows:—

Provinces.	Cholera.		Small-pox.		Fevers.		Dysentery and Diarrhœa.		Plague.		Respiratory Diseases.		Deaths from all causes.		
	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	
														1906.	1905.
Bengal ...	192,396	3·81	22,206	·43	1,204,879	23·42	48,920	·96	59,619	1·17	12,885	·25	1,823,243	36·08	38·53
Eastern Bengal and Assam.	108,878	3·03	6,971	·19	645,733	22·65	26,482	·99	74	·003	8,398	·07	944,438	31·67	35·08
United Provinces of Agra and Oudh.	195,549	3·14	13,209	·28	1,317,491	27·62	26,348	·55	69,660	1·46	20,139	·42	1,865,906	39·07	44·00
Punjab ...	4,132	0·22	15,239	0·66	497,878	20·28	17,505	0·87	97,812	4·58	87,107	2·84	749,906	36·04	47·56
North-West Frontier Province.	...	...	1,587	0·87	58,639	26·24	572	0·89	42	0·02	1,585	0·69	65,249	35·72	36·72
Central Provinces and Berar.	38,768	3·26	9,[illegible]	0·83	225,142	18·95	42,583	3·58	18,121	1·53	16,608	1·40	316,613	43·47	37·21
Lower Burma...	5,589	·39	7,983	1·43	56,122	9·77	3,186	1·65	5,223	·94	4,024	·73	151,193	27·18	24·93
Upper Burma...	1,343	·80	637	·22	27,488	7·84	1,979	·68	2,424	1·17	2,514	·87	76,403	26·27	25·46
Coorg ...	10	·06	532	1·30	4,866	22·62	141	·68	...	...	43	·21	8,285	39·26	26·24
Madras ...	144,813	3·0	29,8[illegible]	0·6	304,926	8·4	61,583	1·7	892	0·02	26,378	0·7	998,691	27·4	21·6
Bombay ...	46,289	2·30	4,062	·22	274,653	14·86	61,736	3·34	51,585	2·79	60,615	3·28	648,419	35·06	31·84
Aden ...	284	·60	271	·58	12,292	25·77	564	1·18	68	·14	322	·67	15,367	32·22	34·25
Total ...	696,519	3·03	109,583	0·48	4,452,813	19·69	298,117	1·32	309,585	1·37	201,307	0·89	7,859,550	34·75	35·36

In the province of Bengal the first three months of the year were unusually wet and cold. The rainfall of the south-west monsoon was irregularly distributed and except in Bihar was in defect. Agricultural produce was below normal in most of the districts. The birth rate per 1,000 of the population, *viz.*, 50,528,044, was 37·32. In towns the birth rate ranged from 61·92 per 1,000 to 4·50. In many towns the exceptionally low birth rates are due to the small numbers of females among the population. Bengal.

The death rate was 36·08 per 1,000 against 38·53 in 1905, the fall being due to a decline in the mortality from plague and the diseases grouped under the heading "fevers."

Male and female infants died at the rates of 214·1 and 198·1 per 1,000 born, respectively. The death rates of males and of females approached each other closely in the age periods 15—20 and 20—30, but the male rates were the higher in every age period, the general male death rate being 37·91 and the female 34·28.

Cholera caused 192,396 deaths or 3·81 per 1,000 of the population against 2·93 per 1,000 in 1905. Excepting the year 1900, the mortality from this disease was the highest ever recorded and no district escaped. In the district of Purnea 9·37 per 1,000 of the population died from cholera, in Bhagalpur 8·23 and in Champaran 6·88. Disinfection of wells with permanganate of potash was carried out in 16 districts where cholera prevailed.

The number of deaths from small-pox rose from 7,213 or ·14 per mille to 22,206 or ·43. Among the districts with the highest mortality Puri stood first with a death rate of 4·85 per mille, followed by Calcutta with 3·42 and Howrah with 1·63.

The recorded death rate from fevers was 22·41 per mille against 24·34 in 1905. Anti-malarial operations were carried out in four towns and a committee was appointed, with a view to ascertain how far the prevalence of malarial fever in the province is due to defective drainage and whether a drainage scheme to remedy the evil is practicable. There was a reduction in the amount of quinine sold, 32,189 parcels (each containing 102 seven-grain packets) having been disposed of, against 35,472 in 1905.

Dysentery and diarrhœa caused 48,920 deaths against 45,260 in 1905. The highest death rates were recorded in the Howrah, Cuttack, Puri and Darjeeling districts. The death rate in towns was more than three times as high as in rural areas.

Plague was much less prevalent, the number of deaths falling from 126,084 in 1905 to 59,619 and the death rate from 2·52 to 1·51. Mortality was highest in the districts of the Patna Division. Nearly three-fourths of the municipal towns escaped, but some suffered severely *e.g.*, Monghyr (death rate 48·94 per mille), Tikari (35·10) and Revelganj (29·49). Rat-killing operations were vigorously carried out in many places, notably in the Jagadispur municipality and surrounding villages where 1,409,351 rats were killed during the period of the experiment.

The birth rate recorded in the municipality of Calcutta was 17·79 per 1,000 of population compared with 18·44 in the previous year, and 25·40 the mean of the five years ending with 1905. The death rate which had risen to 37·95 per 1,000 in 1905 from 32·2 in 1904, fell to 35·73 in 1906. The death rate from plague showed a fall from City and Port of Calcutta.

8·69 to 3·07; the cholera death rate was 2·95 against the provincial average of 3·01 for towns, while a severe outbreak of small-pox increased the death rate due to this cause from ·32 to 3·42 per 1,000. The death rate from fevers was, as usual, comparatively low, 4·58 in 1906 and 5·13 in 1905, the corresponding rates for Bengal as a whole being 22·41 and 24·34.

The total number of European seamen who arrived in Calcutta during 1906 numbered 20,118 against 20,339 in 1905, giving a daily average population of 1,438 against 1,114. There were 13 deaths during the year including 3 from cholera. The average native floating population during 1906 was estimated at 29,768, and the deaths among them numbered 182, giving a ratio of 6·11 per 1,000 against 4·29 in 1905. The deaths incuded 48 from cholera and 37 from fever.

Eastern Bengal and Assam.

The rainfall in Eastern Bengal and Assam was approximately normal in amount, and was fairly evenly distributed, but many districts suffered from floods which injured the growing rice crop or delayed the importation of grain. In the area under registration with a population of 29,812,735, the birth rate was 37·38 per 1,000. As usual the highest district birth rate was that recorded in Goalpara (43·94). The recorded death rate was 31·67 per 1,000 as against 35·06 in 1905. Male infants died at the rate of 205·9, and female infants at the rate of 187·7 per 1,000 born. The death rate from cholera rose to 9·63 per 1,000, the number of deaths being 108,278. January was the month of greatest prevalence and in most districts the prevalence diminished with the onset of the rainy season. The mortality from cholera among the tea-garden coolies was 2·35 per mille. Small-pox was responsible for 6,972 deaths or ·23 per mille of the population. The disease was most prevalent in the Kamrup district where the death rate was 3·08 per mille.

There was a decrease in the prevalence of fevers, the number of deaths being 645,733 or 21·65 per 1,000 as against 23·68 in 1905. Over 68 per cent. of the total mortality was recorded under this heading, and in Dinajpur, which was the district with the highest death rate, over 91 per cent. of all the deaths were recorded as being due to fever. From *kala azar* 2,407 deaths were recorded. It is believed that the disease is gradually disappearing from all parts of the province. An investigation in connection with *blackwater fever* and other fevers in the Dooars is being carried on under the direction of a committee.

From dysentery and diarrhœa the death rate was ·90 per mille. The death rates recorded in districts varied between 5·58 in Lakhimpur and ·05 in Dinajpur.

There were three outbreaks of pneumonic plague resulting in 74 deaths during the year, but the province continued to be free from ordinary bubonic plague. Enquiries regarding the distribution of rats in the province are being carried out. It is said that they are by no means common in the rural areas of the lower districts.

United Provinces of Agra and Oudh.

The health of the general population of the United Provinces was fairly good during the early part of the year, but during the autumn and winter months malaria was more prevalent than usual. In a few districts famine conditions were present until the onset of the rains. The birth rate fell to 40·22 per 1,000 as compared with 41·24 in 1905. The highest district rate was 54·42 in Bijnor and the lowest 27·74 in Ballia. The death rate fell to 39·07 per mille, the number of deaths being 1,863,336 as against 2,098,300 in 1905. The decrease was due almost entirely to the lessened prevalence of plague. The district death rates varied from 80·75 in Jalaun to 26·63 in Dehra Dun. Male infants died at the rate of 249·7 and female infants at the rate of 252·2 per 1,000 born.

Cholera deaths rose from 121,790 or 2·55 per 1,000 in 1905 to 149,549 or 3·14 in 1906. All districts suffered more or less, those with the highest death rates being Jhansi (13·70), Jalaun (11·50), Gonda (10·58) and Kheri (10·24).

The deaths from small-pox rose from 3,273 in 1905 to 13,202 in 1906, the corresponding rates being ·07 and ·28 per mille. Garhwal was the only district which was practically free from the disease during 1906.

The number of deaths from fevers was higher by 33,327 than in 1905 and the death rate was 27·62 per 1,000 as against 26·92. Malarial fevers were considerably more prevalent, the proportion of cases diagnosed under this heading among patients treated at dispensaries rising from 155 per 1,000 of all cases treated in 1905 to 172 per 1,000 in 1906. The number of quinine powders, each costing one pice, sold during the year was 1,205,181. Large quantities of quinine were also distributed gratuitously.

The recorded mortality from dysentery and diarrhœa was almost the same as in 1905; the death rate (·55 per 1,000) was lower than in any other province except the North-West Frontier Province.

The number of plague deaths fell from 383,802 in 1905 to 69,660 and the death rate from 8·05 to 1·46. Three districts escaped altogether and in seven others the number of deaths was less than one hundred. The highest district death rates were 7·82 per 1,000 in Ballia and 5·47 in Bijnor. The death rate among females was 1·68 per mille and among males 1·25.

Punjab.

The rainfall in the Punjab during February and March was exceptionally heavy. The monsoon rains were scanty in July, but abundant afterwards. The last three months of the year were dry and warm. The birth rate fell from 44·4 per 1,000 to 43·7, which is, however, 2·1 per 1,000 higher than the quinquennial mean. The rates in districts ranged from 53·7 in Lyallpur to 20·0 in Simla. The recorded deaths numbered 742,906, which is less by 213,202 than in 1905, the reduction being due to the diminished prevalence of plague. The death rate from all causes was 36·9 per mille as against 47·6 in the previous year. The district death rates varied between 49·7 in Sialkot and 2·42 in Simla. The death rates among male and female infants were 230·2 and 240·1 per 1,000 births respectively.

Cholera caused 4,232 deaths (0·21 per 1,000) against 2,197 (0·11) in 1905. More than one-third of the total number of deaths occurred in the Lahore district. Among the larger towns Rewari was the only one in which the disease prevailed severely.

The mortality from small-pox was 13,239 or 0·66 per 1,000 against 4,723 or 0·23 per 1,000 in 1905. Vaccination is compulsory in 26 towns and the death-rate from small-pox in these was 1·25 per mille; in the towns where vaccination is not compulsory it was 1·58 per mille.

The death rate from fevers was 20·28 per 1,000 against 18·40 in 1905. The proportion of cases diagnosed as malaria in dispensaries rose from 112 per 1,000 of the total number of patients treated in 1905 to 170 per 1,000 in 1906. Quinine was, as usual, distributed gratuitously in a number of districts.

The death rate from dysentery and diarrhœa was ·87 per mille as compared with ·68 in 1905. The highest rate was in the Jhelum district. The death rate recorded in towns was more than three times as high as in rural areas.

Plague was much less prevalent than in any year since 1901; the number of deaths was 104,863 as against 390,233 in 1905. Four districts were free from the disease and in four others the mortality was slight. In rural areas the death rate was 4·45 per 1,000 compared with 5·53 in towns. Females died at the rate of 5·14 per 1,000 and males at the rate of 4·06. Although generally apathetic, the people are gradually becoming less suspicious of proffered assistance. Systematic operations for the destruction of rats were carried out during the plague season of 1906-07 in 8,650 villages and 70 municipal towns.

North-West Frontier Province.

The birth rate in the North-West Frontier Province rose from 35·4 per mille in 1905 to 38·6, which is the highest rate hitherto recorded. The district rates ranged from 46·1 in Kohat to 36·2 in Dera Ismail Khan. It appears that the rise in the birth rate is largely due to improved registration. The special measures for the check of registration carried out during the last three years were continued and show that, although the proportion of male to female births is very high, it is possibly exaggerated by defective registration. The death rate rose from 26·8 per 1,000 in 1905 to 33·7 in 1906. The autumn was very unhealthy.

There was no case of cholera reported during 1906. The death rate from small-pox rose from ·29 per mille in 1905 to ·57. The death rate from fevers rose to 26·14 as against 20·69 in 1905. It is probable that during 1906 the prevalence and severity of malarial fever was greater in this than in any other province. From dysentery and diarrhœa 571 deaths were recorded as compared with 562 in 1905. Previous to 1906 only imported cases of plague had occurred in this province, but in March of that year there was an outbreak of pneumonic plague, which caused 40 deaths in the Hazara district. There were only 3 other cases—2 in Peshawar city and 1 in Dera Ismail Khan.

Burma.

In Lower Burma the birth rate in 1906 was 32·33 per 1,000 against 34·34 in the previous year. In Upper Burma the registration of births was confined in 1906 to 13 towns in which the birth rates ranged from 39·22 in Taungdwingyi to 28·58 in Meiktila. The death rate in Lower Burma rose from 24·93 in 1905 to 27·15; and in Upper Burma from 22·46 to 26·22.

Cholera was more prevalent than in 1905. The death rate in Lower Burma was ·99 per mille and in Upper Burma ·80 per mille. Small-pox caused 8,540 deaths against

6,161 in 1905. Lower Burma was chiefly affected, the death rate being 1·42 per mille as compared with a rate of ·22 per mille in Upper Burma.

In Lower Burma the recorded death rate from fevers was 9·77 per mille as compared with 8·97 in 1905; and in Upper Burma it was 7·34 as compared with 6·76. The number of pice packets of quinine sold at post-offices was considerably greater than in 1905.

The recorded death rate from dysentery and diarrhœa in 1906 was 1·65 per mille in Lower Burma and ·68 in Upper Burma, the rates in the previous year having been 1·43 and ·44 respectively. The increase may have been due partly to the registration of deaths from cholera under the heading dysentery and diarrhœa. The deaths from plague rose from 3,692 in 1905 to 8,637 in 1906. The highest death rates were 11·79 in Rangoon and 6·87 in Mandalay. Males suffered more than females. Over four and a quarter million rats were killed in the different rat-destruction campaigns carried on during the year.

Central Provinces and Berar.

In the Central Provinces and Berar the monsoon rainfall in 1906 was abundant and well distributed, but the heavy rainfall was followed by an unhealthy autumn and mortality was high in August, September and October. The birth rate was 51·72 per 1,000 against 54·02 in 1905. In three districts the rates were 60 per 1,000 or over and the rate was below 45 in only one district. The death rate was 43·47 per 1,000 against 37·21 in the previous year; the rates ranging from 64·38 in Yeotmal to 30·0 in Raipur. In a small town in the Nagpur district the enormous death rate of 220·59 per 1,000 was recorded. More than 12 per cent. of the inhabitants of this town died from plague and more than one per cent. from cholera. Male and female infants died at the rates of 292·16 and 266·35 per 1,000 born, respectively.

Cholera was very prevalent during 1906, the number of deaths recorded being 38,768 or 3·26 per 1,000 of the population against 1,217 or ·10 per 1,000 in 1905. Of the total number of deaths in the year under notice 17,247 occurred in the Central Provinces and 21,521 (7·81 per mille) in Berar. The death rate in Berar has only three times been exceeded during the last 35 years. The deaths from small-pox numbered 9,889 against 8,364 in 1905. The existence of plague is said to have interfered with vaccination during recent years.

The death rate from fevers was 18·95 per mille against 17·43 in 1905. Anti-mosquito operations were carried out on a small scale in a few towns. There was a decrease in the amount of quinine sold during the year, which was attributed to villages being vacated on account of plague.

The death rate from dysentery and diarrhœa (3·58 per mille) was the highest recorded in any province during 1906. The death rate in the Central Provinces was only 1·98, but in Berar it was 8·91, which may have been due partly to deaths from cholera having been registered under the heading dysentery and diarrhœa. Plague caused 18,121 deaths in 1906 against 5,345 in the previous year. Only two districts entirely escaped. The attitude of the people has improved greatly.

Madras.

In the Madras Presidency the birth rate fell to 30·9 per 1,000 in 1906 as compared with 32·0 in 1905. The rates in 16 districts during 1906 were lower than in the previous year, which is ascribed to the continued high price of food grains. The total number of deaths registered was 998,391, or 27·4 per 1,000 against 21·4 in 1905. The district death rates ranged from 46·9 in Madras to 22·0 in Nellore. Cholera, small-pox, fevers, dysentery and diarrhœa were all more prevalent than usual.

Cholera caused 142,811 deaths or 3·9 per mille as compared with 16,888 or ·5 per mille in 1905. Deaths from the disease were reported in all the districts, those with the highest rates being Kistna (8·9), Godaveri (8·3) and Kurnool (7·6). August and July were the months of greatest prevalence.

The death rate from small-pox rose from ·5 to ·8 per mille. A death or deaths from the disease were registered in every district and in all except 10 of the 61 municipal towns.

The death rate from fevers in 1906 was, as usual, much lower than in any of the other large provinces; the total was 304,926 (8·4 per mille) as compared with 265,044 (7·2 per mille) in 1905. In 1906, out of the total of 232 towns in the Presidency, there were only three in which the death rate from fevers exceeded 20 per mille.

Dysentery and diarrhœa accounted for 61,588 deaths or 1·7 per 1,000 of population against 1·4 in 1905. Many cases of cholera may have been returned under this heading. The deaths from plague fell to 898 in 1906 against 5,788 in 1905. The death rate in 1906 was only ·02 per mille.

In Madras City the birth rate which had risen above the average to 46·0 per 1,000 in 1905, fell to 36·6 in 1906. The death rate fell from 59·5 to 46·9 per 1,000, but was lower than in some other municipal towns. The provincial average for towns was 33·4 per 1,000. The total deaths numbered 23,165 against 29,351 during 1905; fevers accounted for 5,352 against 5,496, cholera for 540 deaths against 3,534, dysentery and diarrhœa for 4,386 against 5,542, and the plague deaths rose from 22 to 56. Madras City.

The rainfall in the Bombay Presidency in 1906 was abundant and well distributed, but prices of food grains were at a higher level than normal. The birth rate was 33·84 per 1,000 compared with 33·07 in 1905, but the death rate rose to 35·06 as compared with 31·84. In the Poona district the death rate was 50·84 and the next highest rates were 43·04 in Ahmedabad and 40·71 in Nasik. Male infants died at the rate of 226·0 and female infants at the rate of 214·17 per 1,000 born. Bombay.

Cholera was much more prevalent during 1906, the number of deaths registered being 46,119 or 2·50 per mille as compared with 5,396 or ·29 per mille in 1905. Of the 25 districts all except Kaira were more or less affected, the highest rates being recorded in Colaba (7·61), Poona (6·64), Nasik (5·34) and Thana (5·25).

From small-pox only 4,963 deaths were recorded as compared with 16,985 in 1905.

The death rate from fevers was 14·86 per mille as compared with 13·28 in 1905. Malarial fevers were much more prevalent than in the previous year.

The deaths ascribed to dysentery and diarrhœa numbered 61,736 in 1906 and the death rate was 3·34 per mille. The number of deaths was larger than that recorded in any other province during the year and the death rate was higher than in any other province except the Central Provinces and Berar.

The number of deaths from plague fell in 1906 to 51,525, the smallest total since 1900. The urban district of Bombay suffered most, the death rate being 14·20 per mille which, however, was lower by 4·43 than the rate of the previous year. Mortality was heavy in the districts of Poona, Kaira, Karachi, Panch Mahals, Satara and Ahmedabad, and in the city of Poona the very high death rate of 66·72 per 1,000 was recorded.

In Bombay City the birth rate rose from 24·75 per 1,000 in 1905 to 26·96 in 1906. The death rate also showed an increase from 62·33 to 68·98. The number of deaths from plague fell to 10,802 (death rate 14·20 per 1,000) from 14,171 (death rate 18·63) in 1905. Cholera caused 1,223 deaths against only 25 in the preceding year, giving a rate of 1·61 per 1,000, and both fevers and respiratory diseases showed increased rates, 5·49 and 20·02 per 1,000 compared with 3·41 and 12·19, respectively, in 1905. City and Port of Bombay.

In Bombay Port, 948,411 crew and passengers were examined during 1906 and the clothing and bedding of 105,302 were disinfected. At the outward and inward inspections and on board vessels in the harbour or docks there occurred 33 cases of plague, 7 of cholera and 123 of small-pox: 7 cases of jigger and one case of leprosy were also detected.

The pilgrim season of 1905-06 was the last for which the segregation of pilgrims for five days at Bombay, prior to embarkation, was enforced. In all 18,390 pilgrims left Bombay for the pilgrimage to the Hejaz, and according to the Indian reports there was an increase of 6,097 pilgrims during the season as compared with the previous one. The health of the pilgrims was satisfactory. For the pilgrim season of 1906-07 new regulations came into force. Red Sea Pilgrim Traffic.

IV.—JAILS.

Sickness and mortality in 1906.—In spite of the unhealthiness of the year 1906, the health of the prisoners in jails was good, and although there was considerably more sickness than in 1905, the duration of illness was generally short, and the death rate was only 19·27 per 1,000 or 1·66 higher than the lowest rate ever recorded. The mean daily population of the jails in India and Burma (excluding the Andamans) was 95,394; the rate of admission to hospital was 658 per 1,000, the constantly sick rate was 27 per 1,000 and the death rate was 19·27 per 1,000. In all provinces except Madras, Bombay and the North-West Frontier Province the death rates were lower than in 1905.

The following statement shows the sickness and mortality among all classes of prisoners in the jails of the various provinces for 1906 as compared with 1905 :—

Provinces.	1905.			1906.		
	Ratio per 1,000 of average strength.			Ratio per 1,000 of average strength.		
	Admissions.	Constantly sick.	Deaths.	Admissions.	Constantly sick.	Deaths.
Bengal	954	39	24·9	1,009	38	23·4
United Provinces of Agra and Oudh	569	27	17·3	603	27	16·6
Punjab	708	26	16·3	737	26	15·8
North-West Frontier Province ...	950	34	19·8	1,465	35	25·4
Burma	320	17	17·0	280	16	14·8
Central Provinces and Berar ...	630	21	15·8	598	19	13·8
Eastern Bengal and Assam ...	1,081	46	33·0	912	43	29·7
Madras	469	19	15·9	417	19	21·8
Bombay	603	27	17·4	689	31	20·7
INDIA (excluding the Andamans)	647	28	19·2	658	27	19·3

Chief diseases.—The chief causes of sickness were intermittent fever (admission rate 207 per 1,000), dysentery (80), abscesses, ulcers and boils (69), diarrhœa (39), and respiratory diseases other than pneumonia (25); while the chief causes of death were dysentery (death rate 3·25 per 1,000), tubercle of the lungs (3·21), pneumonia (2·55) and cholera (1·10). There was an increase in the incidence of all diseases except influenza, other respiratory diseases, dysentery, diarrhœa, spleen diseases, scurvy and abscesses, ulcers and boils. The admission rate from intermittent fever rose from 182 per 1,000 in 1905 to 207, but the death rate was only ·75 per 1,000 which, with the exception of the rate of ·66 in 1904, is the lowest on record. Remittent fever caused 140 admissions as compared with 109 in 1905. The admission rate from dysentery fell from 81·6 per 1,000 in 1905 to 78·9, but the death rate rose to 3·25 per 1,000. A rise in the death rate occurred in all provinces except Burma and Bengal. An enquiry into the causation, prevention and treatment of dysentery in jails is being conducted. There was a very slight fall in the admission and death rates from diarrhœa. Pneumonia caused an admission rate of 10·1 per 1 000 and a death rate of 2·55 against rates of 9·7 and 2·28 respectively in 1905. The frequency and fatality of the disease in the different provinces as usual varied greatly. The admission rate from tubercle of the lungs, which was 8·4 in 1904 and 8·7 in 1905 rose to 8·8 and the death rate 3·21 per 1,000, was slightly higher than in any of those years. The prisoners in Bengal, Madras and Eastern Bengal and Assam were most affected during the year. There were 82 admissions and 9 deaths from small-pox against 31 admissions and 4 deaths in 1905; and 186 admissions and 165 deaths from cholera against 73 and 46. The number of cases of plague fell to 19 and the number of deaths to 8. The number of cases diagnosed as enteric fever is increasing; in 1906 there were 102 cases with 18 deaths. Cerebro-spinal fever accounted for 12 deaths.

Lack of sufficient accommodation is a serious defect in the majority of jails in Bengal and many are badly situated in the centre of a town or bazaar. Many improvements, however, were effected during 1906 and many others are in progress The mean daily population of the jails in 1906 was considerably higher than in 1905, but while the rate of admission to hospital rose from 953·5 per 1,000 in 1905 to 1,008·8 in 1906 the death rate fell from 24·91 to 23·36. The principal causes of admissions to hospital were intermittent fever (32 78 per cent. of all admissions), dysentery (18·59) and diarrhœa (8·41); and the principal causes of death, dysentery (24·5 per cent. of all

deaths), tubercle of the lungs (18·4) and pneumonia (12·7). There was a marked reduction in the number of deaths from intermittent fever. The admission and death rates from dysentery were lower than in 1905, but tubercle of the lungs caused 275 admissions and 64 deaths as compared with 192 admissions and 59 deaths in that year. There has been a steady reduction from year to year in the case-mortality of tubercle of the lungs, which may mean that patients are discovered and admitted to hospital at an earlier stage of the disease than formerly was the case. The general death rate in four jails was over 40 per 1,000.

Eastern Bengal and Assam.

The average strength of the prisoners in Eastern Bengal and Assam rose from 6,401 in 1905 to 6,871 in 1906, and the majority of the jails were more or less over-crowded during a part or the whole of the year. The admission rate, the constantly sick rate and the death rate, however, were lower than in the previous year. The chief causes of admission to hospital were dysentery (26·56 per cent. of all admissions), and intermittent fever (25·75) and the chief causes of death, dysentery, pneumonia and tubercle of the lungs. Twenty cases of enteric fever with 5 deaths were recorded during the year and 14 cases of cholera with 13 deaths.

United Provinces of Agra and Oudh.

In 1906 the admission rate, constantly sick rate and death rate, in the jails of the United Provinces were 603, 27 and 16·56 per 1,000 respectively as compared with 569, 27 and 17·31 per 1,000 in 1905. Intermittent fever, dysentery and tubercle of the lungs were more prevalent than in the previous year, but the fatality of dysentery was the lowest on record. Death rates over 30 per 1,000 were recorded in five of the larger jails, of which the highest rates were 46·24 in the Ghazipur district jail, 46·59 in the Orai district jail and 35·97 in the Hamirpur district jail. Cholera was epidemic among the general population and was introduced into nine jails, but the measures taken effectually prevented an epidemic among the prisoners and only 17 cases with 11 deaths were recorded in all the jails.

Punjab.

The average strength of the jail population in the Punjab was 11,744 in 1906 as compared with 11,512 in 1905, and although there was a slight increase in the rate of admission to hospital the death rate fell from 16·33 to 15·75 per 1,000, which is the lowest rate recorded since 1896. Intermittent fever was the principal cause of admission to hospital, and tubercle of the lungs, pneumonia and dysentery were the principal causes of death. Despite the absence of over-crowding and the good arrangements which exist in most of the jails, tubercle of the lungs was, as usual, considerably more fatal than in the jails of any other administration. Dysentery was considerably most prevalent and more fatal than in 1905, and pneumonia caused 31 deaths as compared with 29 in that year. No case of cholera occurred during the year and only six cases of plague and seven of small-pox.

North-West Frontier Province.

The year 1906 was an unhealthy one in the North-West Frontier Province and the rates of sickness and mortality among the prisoners were considerably higher than they have been for many years. Intermittent fever caused 55·25 per cent. of the total admissions to hospital, the admission rate being higher than in any year since 1897. Dysentery caused 102 admissions against 60 in 1905, tubercle of the lungs 10 against 5, and pneumonia 31 against 18. Influenza was prevalent in the Peshawar jail.

Burma.

The average strength of the jail population in Burma in 1906 was higher than in 1905, and there was more or less over-crowding in 17 of the 32 jails. The admission, constantly sick and death rates, however, fell from 320, 17 and 17·01 per 1,000 respectively in 1905 to 280, 16 and 14·81 per 1,000. The three rates were the lowest on record for Burma. Intermittent fever was the chief cause of sickness, but the admission rate from it was only 49·7 per 1,000, which is far lower than that recorded in any other administration. Tubercle of the lungs, dysentery and pneumonia were the chief causes of death. From tubercle of the lungs there were 114 cases with 56 deaths during the year. Arrangements are made for the segregation of all patients suffering from this disease and the open-air system of treatment is carried out as far as local conditions permit. There was a satisfactory decrease in the sickness and mortality from dysentery. Seven cases of cholera (with 3 deaths) and 2 of plague (one fatal) occurred during the year.

Central Provinces and Berar.

The admission, constantly sick and death rates among the prisoners in the Central Provinces and Berar in 1906 were all lower than in 1905, the death rate, 13·82 per 1,000, being lower than that recorded in any other administration during 1906. Intermittent fever was the principal cause of sickness; and dysentery, tubercle of the lungs and pneumonia the principal causes of death. Dysentery caused 7 deaths, tubercle of the lungs 6 and pneumonia 4. In the Central jail at Jubbulpore there was no admission from dysentery or diarrhœa during the year.

Madras. In the jails of the Madras Presidency the admission rate and the constantly sick rate among the prisoners were lower than in 1905, but the death rate rose from 15·87 per 1,000 to the comparatively high rate of 21·77. This was due mainly to the occurrence of cholera, the death rate from which was higher than in any year since 1897. This disease attacked the prisoners in eight jails and caused in all 82 admissions to hospital and 45 deaths. The death rate from dysentery was higher than in any year since 1898. There was only a very slight increase in the death rate from tubercle of the lungs as compared with 1905 and as usual the comparatively low fatality of this disease in the Madras jails was a satisfactory feature of the statistics.

Bombay. There was more sickness among the prisoners in the Bombay Presidency during 1906 than during the previous year, and the death rate rose from 17·45 to 20·69. Ague, which was the principal cause of sickness, accounted for 20·21 per cent. of the total admissions to hospital. Pneumonia and cholera were the principal causes of death, the former accounting for 17·7 per cent. of all deaths and the latter for 11·6 per cent. There were in all 45 cases of cholera with 18 deaths, the chief outbreaks occurring in the Bombay common prison and in the Yerrowda central prison. Pneumonia caused 122 admissions to hospital and 29 deaths, and dysentery 434 admissions and 16 deaths, both diseases having considerably higher death rates than in 1905.

Andamans. In 1906 the rainfall in the Andaman Islands was below normal. There was a further increase of the convict population, but there was no over-crowding except occasionally in the hospital. Accommodation was increased by the erection of 15 temporary barracks, and the improvement in the food-supply of the convicts has been maintained. On an average strength of 14,688 the admission rate in 1906 was 2,041 per 1,000 and the constantly sick rate was 70 per 1,000. There was a remarkable fall in the death rate from 38·96 per 1,000 in 1905 to 27·30, the fall being due almost entirely to the reduction in the deaths from dysentery. The number of admissions from this disease fell from 2,359 in 1905 to 1,381 and the number of deaths from 187 to 72. The death rate from tubercle of the lungs fell from 6·48 per 1,000 to 5·58, but from pneumonia it rose from 4·81 to 5·38. Influenza was epidemic during the year and caused 385 admissions to hospital, fatal attacks of pneumonia following the illness in 47 instances. Malarial fevers were the cause of an admission rate of 1454 per 1,000, and a death rate of 3·47, both being lower than in 1905. Anti-mosquito measures are said to have freed the island of Ross from malaria, and are being undertaken elsewhere.

V.—VACCINATION.

The total number of operations performed by the special Vaccination Department in India and by the staff at dispensaries in 1906-07 was 9,080,303, of which 8,341,794 were primary operations and 738,509 were revaccinations. The total number of operations was less by 197,593 than in 1905-06, but it is considerably higher than the total of any of the preceding three years. The decline in the number of operations as compared with the previous year was shared by every province except Madras, and was greatest in Eastern Bengal and Assam and in Burma. The percentage of success in primary operations was 97·21 compared with 97·20 in 1905-06. According to age, 4,050,283 children under one year of age and 3,302,345 children between one and six years of age were successfully vaccinated. The rate per 1,000 of the population protected against small-pox by the year's operations was 35·41 as against 36·39 in the previous year, the rates in the larger provinces ranging from 42·06 per 1,000 in the Central Provinces and Berar to 25·36 in the Bombay Presidency. The cost of the special department was £89,671.

The following statement shows the results of vaccination in 1906-07.

Province.	Population among whom vaccination was carried on.	Number of persons vaccinated including revaccinations, by special department and dispensary staff.	Ratio of successful vaccinations per 1,000 of population.	Number of children successfully vaccinated.		Percentage of annual estimated births at 40 per 1,000 of population successfully vaccinated.
				Under one year of age.	Between one and six years of age.	
Bengal	51,625,771	2,037,273	37·80	814,772	943,050	39·46
Eastern Bengal and Assam ...	30,788,134	1,318,032	41·33	360,810	720,542	29·30
United Provinces of Agra and Oudh	47,560,667*	1,675,060	33·31	930,316	517,672	48·49
Punjab	20,293,834	765,219	32·00	487,441	90,739	60·05
North-West Frontier Province ...	2,104,812	91,893	39·67	47,258	17,412	56·13
Burma	10,477,508	449,652	33·06	77,858	175,396	18·58
Central Provinces and Berar ...	13,621,559	617,381	42·06	404,063	95,056	73·61
Madras Presidency	38,408 531	1,551,600	35·66	490,417	645,932	31·92
Bombay Presidency ...	21,690,595	630,861	25·36	430,300	89,192	49·71
Coorg	180,607	11,232	54·58	919	4,841	12·72
Ajmer-Merwara ...	476,922	12,100	24·79	9,129	2,444	47·86
TOTAL ...	237,378,940	9,080,303	35·41	4,050,283	3,302,345	42·62

*Includes 16,010 persons enumerated at the Ajudhya fair.

Bengal.

There was a fall of 29,649 in the number of primary operations performed in Bengal in 1906-07 as compared with 1905-06 but a rise of 25,692 in the number of revaccinations. Of the 34 districts in the province there was an increase in the number of vaccinations in 13 and a decrease in 21. As a rule the reasons for increase or decrease are peculiar to each district. The system of rewards to vaccinators is to be continued. The quality of the work shows an improvement; in primary cases 99·24 per cent. were successful compared with 99·13 in 1905-06 and in revaccinations 70·40 per cent. compared with 66·29. Of the total primary vaccinations 87,803 were performed with calf lymph, 696,415 with lanoline lymph and 1,090,758 by the arm-to-arm method; the percentage of success under each of these methods being 99·08, 98·25 and 99·13 respectively. In towns 87·29 per cent. of the number of available infants were successfully vaccinated against 85·82 per cent. in the previous year.

Eastern Bengal and Assam.

The total number of operations performed in Eastern Bengal and Assam during 1906-07 was less by 110,994 than in 1905-06 and less by 3,181 than the average yearly number during the preceding quinquennium. The percentage of success in primary operations was 98·55. The inspecting agency in Eastern Bengal was combined with that in Assam on the 1st April 1907 and the cadre is to be increased by 10 officers.

United Provinces of Agra and Oudh.

In the United Provinces during 1906-07, primary cases were fewer by 28,419 than in 1905-06, but revaccinations were more numerous by 8,963. The percentage of success in primary work was 97·72 as compared with 97·93 in the previous year. Of the estimated number of infants available in municipal towns 93·4 per cent. were successfully vaccinated. Lymph depots were maintained at Lucknow and Patwa Dangar (Naini Tal). The great majority of the operations were performed with glycerinated lymph.

Punjab.

There was a considerable fall in the number of vaccinations performed in the Punjab during 1906-07 which was attributed to the prevalance of malarial fevers

during the first half of the vaccinating season and to the very great increase of plague during the second half. Of the available children under one year of age 71·44 per cent. were successfully vaccinated in towns where the Vaccination Act is in force and 68·04 per cent. in towns where it does not apply. The results obtained with chloroformed glycerine vaccine continued to be very satisfactory; in 152,080 primary vaccinations performed with it 99·88 per cent. were successful.

North-West Frontier Province.

In the North-West Frontier Province the number of operations was less by 8,973 than in 1905-06. In primary operations all the districts except Peshawar where there was an increase of 1,084 operations, show a smaller amount of work. The chief cause being the severe prevalence of fever during the vaccinating season. The percentage of success in primary vaccinations was 98·95. Animal lymph was largely used in the settled districts of the province where there are facilities for obtaining buffalo calves.

Burma.

The number of operations performed in Burma in 1906-07 was less by 60,289 than in 1905-06. The decline was attributed chiefly to the presence of plague as there was proof that the people were confusing vaccination with inoculation against plague. The ratio of success in primary vaccinations was 90·65 per cent. The vaccine lymph for the whole province except Rangoon is manufactured at the Meiktila depot. There are difficulties owing to the high temperature during some months of the year and proposals have been made to open a vaccine institute at the hill station of Maymyo where these disadvantages will be avoided.

Central Provinces and Berar.

In consequence of prevalence of plague the number of primary vaccinations performed in the Central Provinces and Berar in 1906-07 was less than in 1905-06. The number of revaccinations increased by 17,747. The percentage of success in primary operations was 98·56 and 75·38 in revaccinations. In municipalities 81·93 per cent. of the available number of infants were protected during the year. The great majority of the vaccinations were performed with glycerinated lymph.

Madras.

In the Madras Presidency 86,610 more vaccinations were performed during 1906-07 than during the previous year, the total amounting to 1,551,600 cases. The percentage of success in primary cases rose from 92·9 to 93·4. The increased number of operations is attributed to the prevalence of small-pox. There was a decrease in the number of vaccinations performed in two districts, *viz.*; Tanjore and Chingleput, the diminished work being attributed to the absence of vaccinators, to the smaller number of unprotected persons and to the short supply of vaccine paste. Lanoline lymph supplied by the King Institute was used in the great majority of operations with a percentage of success which varied between 96·9 and 94·0 in different areas. With the glycerine lymph supplied by the King Institute only 6·3 per cent of cases proved successful.

Bombay.

There was again a decrease in the number of vaccinations performed in Bombay, the total being less by 26,286 than in 1905-06. The largest decrease in both primary cases and revaccinations occurred in the Sind registration district, the chief cause being the great prevalence of malarial fever. The percentage of success in primary operations fell from 97·56 in 1905-06 to 95·93, and in revaccinations from 76·13 to 71·75; and only 49·71 per cent. of the estimated infant population were successfully vaccinated, against 52·32 per cent. in the previous year. Good progress was made in the substitution of glycerinated vaccine for calf and human lymph and by the end of the year the use of preserved lymph had been introduced in all British districts except Sind.

VI.—MEDICAL INSTITUTIONS.

Civil Hospitals and Dispensaries.

Institutions and patients.—The institutions included under this head are those classed as (1) State—Public; (2) Local Fund; and (3) Private-aided. The great bulk of their income is derived from Government, local and municipal funds, and their total expenditure in 1906 was £633,592.

The dispensaries not included comprise (1) State—Special (Police, Forests, Surveys, Canals, etc.); (2) Private non-aided; and (3) Railway. Taken together this class numbered 1,490, and provided treatment for 137,936 in-patients and 5,746,244 out-patients, as compared with 128,690 in-patients and 6,107,000 out-patients in 1905.

The following comparative statement shows the number of hospitals and dispensaries under official control in the several provinces during 1906 and 1905, the number of in and out-patients treated, and of operations performed:—

		Number of institutions.	Number of in-patients.	Number of out-patients.	Total number of patients.	Number of operations.
Bengal	1906	319	36,435	2,520,889	2,557,324	117,812
	1905	305	33,384	2,328,545	2,361,929	112,218
Calcutta and Howrah ...	1906	15	25,012	265,480	290,492	29,590
	1905	15	25,168	263,267	288,435	30,110
Eastern Bengal and Assam ...	1906	336	24,575	3,000,318	3,024,893	74,156
	1905	331	21,714	2,881,907	2,903,621	73,989
United Provinces of Agra and Oudh	1906	349	59,334	3,903,319	3,962,653	188,572
	1905	343	52,432	3,633,557	3,685,989	184,346
Punjab	1906	277	62,826	3,707,582	3,770,408	192,643
	1905	264	57,091	3,199,250	3,256,341	180,408
North-West Frontier Province ...	1906	37	8,888	575,744	584,632	23,682
	1905	37	8,129	528,061	536,190	23,382
Burma	1906	148	49,248	967,072	1,016,320	25,893
	1905	141	55,610	967,245	1,022,855	24,536
Central Provinces and Berar ...	1906	156	12,336	1,660,370	1,672,706	41,044
	1905	149	12,497	1,611,525	1,624,022	40,942
Coorg	1906	7	1,031	48,030	49,061	803
	1905	7	1,005	43,189	44,194	640
Madras	1906	483	68,348	5,187,601	5,255,949	175,076
	1905	491	66,930	5,170,575	5,237,505	187,436
Bombay	1906	309	51,593	2,244,121	2,295,714	82,332
	1905	301	51,068	2,125,324	2,176,392	82,113
Total ...	1906	2,436	399,626	24,089,526	24,489,152	951,603
	1905	2,384	385,028	22,752,445	23,137,473	940,120

The number of in-patients, and out-patients, and of operations performed, increased. There is still need for more dispensaries and for improvement of existing ones. The health of the Province was better than in 1905, so there is evidently a growing tendency to obtain medical aid in the dispensaries. There was greater prevalence of cholera and small-pox during the year, but less malarial fever and plague. The steady rise in the number of female patients is satisfactory. The pauper wards, which have been constructed in 48 dispensaries, are very popular. Bengal.

The accommodation at the Campbell and Eden Hospitals was curtailed owing to building operations. Small-pox was epidemic during part of the year, and 81 cases of cerebro-spinal fever came under treatment, as compared with one in 1905. Several of the large hospitals are at present undergoing structural alterations, to bring them into line with modern requirements. Calcutta and Howrah.

There was an increase of 4 per cent. in the number of in and out-patients, 9·96 per cent. of the population having applied for relief, as compared with 9·56 in 1905. The Nagas are resorting more freely than heretofore to the dispensaries. The death-rate in hospital was 9·2, the same as last year. The diseases most prevalent were skin diseases, which accounted for 21·67 per cent. of the total admissions. Malaria, *kala azar*, and cholera gave fewer admissions than in 1905. There was however an increase in the number of cases of small-pox under treatment. The total number of operations performed shows a slight increase, but considerably more of these were selected operations, 3,019 as compared with 2,676 in 1905. The attendance at the female dispensaries fell from 13,557 to 12,462, and is ascribed to the absence on leave, during part of the year, of the lady doctors. Eastern Bengal and Assam.

There is again a large increase in the number of attendances and admissions. The death rate was 4·73. Dysentery, malarial fever, diseases of the eye and skin, all show an increase, as does tubercular disease; but plague seizures declined from 334,679 to 65,924. United Provinces of Agra and Oudh.

Visits paid to patients at their homes by lady doctors and female hospital assistants are becoming very popular, and the number of such visits has risen from 4,676 to 5,985. Surgical operations also show a steady increase, and there were only 441 deaths out of 188,572 cases operated on. Many large and important works were executed during the year, notably in connection with new hospitals at Moradabad and Orai, and certain of the Dufferin hospitals. There is still a shortage of civil hospital assistants, and the strain on the medical staff was severe, especially in districts in which famine conditions obtained. A revised scale of pay has been sanctioned for female hospital assistants.

Punjab. There was a further increase of in and out-patients throughout the province. This is accounted for by the prevalence of malarial fever, which caused twice the normal number of admissions in certain districts. Of other diseases, those of the eye and ear, skin affections and cholera show the largest increase. The percentage of deaths among in-patients has risen slightly, from 3·17 to 3·22. The number of beds maintained was 3,603 (of which 1,298 were for women) against 3,398 in 1905. It is found that during the spring and autumn this number is insufficient. The total number of operations performed has risen from 180,498 to 192,643; and of these 19,421 were selected operations. For cataract alone 8,010 operations were performed, as compared with 7,683 in the previous year. Contributions by municipalities and local bodies to medical institutions are said to be inadequate, and larger expenditure on buildings, drugs and appliances is considered inevitable.

North-West Frontier Province. There is an increase in the number of admissions, of out-patients, and of operations performed. The most satisfactory features are the rapidly growing popularity of dispensary treatment in the trans-Frontier agencies, Dir, Swat, Chitral, Tochi, etc., and the increasing proportion of women in these places seeking medical aid. In Dir, Swat and Chitral the number of female patients rose from 2,324, in 1905, to 4,348. There was a severe epidemic of malarial fever all over the Frontier, which was mainly responsible for the larger number of admissions. More money is required to improve the buildings and equipment of the dispensaries.

Burma. The number of in-patients decreased, and this is ascribed chiefly to plague in the big towns. There is an increase of admissions for cholera, small-pox, venereal disease and tubercle. A remarkable feature of the decline in attendance is that it is apparently confined to Burmese and to Mahomedans,—other races, *e.g.*, Hindus, Eurasians and Europeans showing an increase under all heads. There was an increase in the number of operations; much is to be expected of the newly introduced system of reserved female accommodation and female attendants in the dispensaries, and the appointment of lady doctors to out-patient dispensaries in Rangoon and Mandalay. The General Hospital, Rangoon, will, it is hoped, shortly be enlarged, and be provided with a more adequate staff. There is still a considerable shortage of hospital assistants; it is hoped that the new medical school will gradually help in keeping up the establishment, and that the conditions of service of civil and military hospital assistants will ere long be improved.

Central Provinces and Berar. There was a small decrease in the number of in-patients, ascribed to the prevalence of plague and cholera, which materially affected the attendance in certain districts. The diseases which showed the most marked increase were malaria, skin diseases, diarrhœa and cholera. The mortality among in-patients rose from 6·4 to 7·8, but this was due to many of the cholera patients being brought to hospital in a moribund condition. Female attendance was satisfactory, but was much interfered with by the prevalence of plague.

Madras. There is a steady increase in the attendance at dispensaries, the most satisfactory feature of which is the larger number of Mahomedan women treated. The increase in fact is almost entirely due to the larger number of women applying for treatment. There was a greater prevalence than usual of malarial fever, respiratory diseases, cholera, dysentery and diarrhœa, and a very marked increase of cases of ophthalmia. There was a decline in the number of operations. Several new hospitals and wards have been completed. The district midwives are doing good work, having attended 30,238 cases of labour; and the demand still exceeds the supply.

Bombay. There is an increase in the number of in-patients and out-patients; diseases which were most prevalent were malaria, dysentery, diarrhœa and respiratory affections. The total number of operations performed remains about the same, but the 'selected' operations represent a larger proportion of the whole. A Central Nursing Service for the whole Presidency has been sanctioned, and is in course of formation. It will supervise the training and supply of nurses to *mofussil* hospitals. A great deal has been done in improving hospitals and equipment generally, and bringing the dispensaries to a higher level of efficiency.

Lunatic Asylums.

The following table shows the strength of the asylum population in 1906, and the statistics of sickness and mortality :—

Administrations.	Admitted and readmitted during year.	Total asylum population.			Discharged cured.	Died.	Daily average strength.	Daily average sick.	Number of criminal lunatics.
		Male.	Female.	Total.					
Bengal	211	878	207	1,085	89	85	827·08	84·93	539
Eastern Bengal and Assam.	147	480	92	572	52	28	454·68	29·03	283
United Provinces ...	345	1,195	342	1,537	124	130	1,215·86	90·18	350
Punjab	174	605	165	770	68	57	604·75	56·26	141
Burma	163	554	75	629	36	32	474·69	31·07	291
Central Provinces ...	61	264	83	347	17	31	298·50	9·32	89
Bombay	392	1,016	271	1,287	114	61	927·60	46·10	189
Madras	225	594	210	804	69	72	606·63	41·66	161
Total ...	1,718	5,586	1,445	7,031	569	496	5,409·79	368·55	2,043

The total number admitted and readmitted to asylums was 1,718, the average for five years being 1,401. The total asylum population for 1906 was 7,031. The lunatics in asylums represent only a small proportion of the insane population.

Owing to the difficulty of ascertaining the previous history of patients the causes of insanity are in most cases unknown. The commonest forms of insanity are mania and melancholia.

The Cuttack asylum has been closed. A new central asylum is to be erected at Ranchi. A medical officer has been appointed Superintendent of the Berhampore asylum. There was slight overcrowding at Patna and Bhowanipur. The percentage of recoveries was 10·76, as compared with 9·91 in 1905. There was an increase in sickness at Berhampore, due mainly to malarial fevers. The water-supply and drainage are now being dealt with, and special blocks are to be built for the segregation of tuberculous cases. Bengal.

There was overcrowding in Dacca during most of the year. To remedy this a special tubercle ward is being constructed. In the Tezpur asylum criminal accommodation is deficient, and a new ward is being built. The general health showed an improvement; tubercle of the lungs is still very prevalent. Eastern Bengal and Assam.

The Lucknow asylum was closed in June. The general health was good, and the percentage of cures rose from 10·73 to 13·33. There was a rise in mortality at Agra the cause of which is not apparent. There was no overcrowding. United Provinces.

There was a marked rise in the daily average sick from 42·18 to 56·26, ascribed to the prevalence of malaria. This increase was confined to the males. The hospital in the male section was found to be unequal to requirements. There were two deaths by suicide, neither patient having previously exhibited suicidal tendencies. Steps have been taken to segregate juvenile lunatics, and it is hoped that this will soon be possible in the case of criminal lunatics. The percentage of recoveries was 11·24, as compared with 11·73 in 1905. Punjab.

Owing to overcrowding, criminal lunatics were transferred to a disused jail, and an old building has been restored to permit of some of the female lunatics being accommodated. The water-supply has been efficiently filtered, with a consequent marked decline of bowel affections. There was a decline in the average daily sick rate and mortality. There was one case of suicide. When funds are available a new asylum will be built. Burma.

Female lunatics are being removed from Jabalpur to Nagpur, and new wards are under construction at the latter. There is still slight overcrowding at Jabalpur. The year was unhealthy at Nagpur, but at Jabalpur the health remained good throughout the year. The scheme for a central asylum has been abandoned. Central Provinces.

The average daily sick in the three asylums fell from 62·89 to 41·66. The largest number of admissions were due, as usual, to bowel affections and tubercle. The mortality fell from 14·64 to 11·87, a figure closely approximating to the 10·03 of English asylums. There was no overcrowding. Madras.

The criminal population rose from 162 to 189. The death rate rose from 6 to 6·6 per cent., the increase being mainly in the Ahmedabad and Hyderabad asylums. The year was not a healthy one, and malaria was very prevalent. At Colaba and Ratnagiri the question of water-supply is being dealt with. There was no overcrowding in any of the asylums, but the number of lunatics accommodated approached that for which provision is made. Bombay.

Medical Schools.

Bengal. In addition to the Calcutta Medical College there are three other medical schools maintained by Government, *viz.*, the Campbell, Temple and Cuttack schools. There are, in addition, unaided institutions.

The number of male students at the Calcutta medical college fell from 487 to 478, and there were 15 female students, as against 13 in 1905. There were 78 military students studying for the Assistant Surgeon branch of the Indian Subordinate Medical Department, and the total number remaining at the end of the session, male and female, was 425. Out of 7 candidates, 4 passed the final Medical Board examination, and 74 out of 130 obtained the diploma of Licentiate Medicine and Surgery (L. M. S.). Sanction has been accorded by Government to large additions to the buildings which will be taken in hand shortly, and will consist of a library, examination hall, common rooms and a theatre.

The Campbell school has been greatly improved structurally, and additions are being made to the Temple and Cuttack schools. The total number of students, male and female, remaining at the end of the year was 225. Sixty-four students passed as Hospital Assistants, of whom only 20 entered Government service, and 72 students passed the examinations for compounder. A strike occurred at the Campbell school, which resulted in the dismissal of 42 students.

Eastern Bengal and Assam. The total number of students at the Dacca and Berry-White schools was the same as last year. Twenty-six students of the latter and 29 of the former passed the final examinations and received diplomas.

At the Dacca school an examination hall, laboratory and gymnasium are to be built, and the provision of a hostel for the students is contemplated.

United Provinces. The number of students attending the Agra medical school remained practically the same, 314 as compared with 317 in 1905. There was a decrease in the number who entered for the military hospital assistant class. Out of the 20 female students, 15 passed their final examination. The accommodation in the students' hostel is being improved, and the new dissecting room has been completed.

Punjab. There was a decline in attendance at the Lahore medical college and school from 552 to 505, the decrease being in the school, where the average number of students was 248 against 292 last year. This is ascribed to the raising of the standard of preliminary education in 1905. There has been a large increase in the number of Government scholarships, and of stipendiary students in the school. In the final Medical Board and M. S. examinations, 19 passed out of 28; of these, two women passed out of 3 who competed. In the school 98 went up for the Hospital Assistant's diploma, and 82 passed. An important scheme for improving the present college and hospital accommodation is now before Government.

Madras. There were 327 students on the rolls of the Madras medical college, a decrease of 32. At the final examinations for the Medical Board and L. M. S., the results were good, 60 per cent. of successes having been obtained, as compared with 46 per cent. last year. Fewer entries occurred in the apothecary, chemist and druggist, and Sanitary Inspector's Departments; as regards the first mentioned, this was due to the increasing unpopularity of the military Hospital Assistant branch of the Indian Subordinate Medical Department The College laboratories require extension, and there is need for a hostel for the students.

Bombay. Including 62 military medical pupils, there were 700 students at the Grant medical college at the commencement of 1906. At the final examination of the L. M. S., 55 students passed out of 195 candidates. Of those who were successful, 6 were women. Twenty-two military students entered the Assistant Surgeon branch of the I. S. M. D. The accommodation for laboratories and classes is still defective; a scheme for the extension of the existing buildings is under consideration. A Minor Chair in Bacteriology has been sanctioned, and proposals made for supplementing the teaching staff. A hostel for students will be commenced shortly.

The schools at Poona, Ahmedabad and Hyderabad (Sind) continued to work satisfactorily. Their combined average attendance was 294 as compared with 287 last year.

Institutes.

Accounts of the Central Research Institute at Kasauli, the Bombay Bacteriological Laboratory, the King Institute, Madras, and the Pasteur Institutes in India, will be found at pages 107 and 108 of this report.

VII.—SANITATION.

In the province of Bengal there was an increase of expenditure on conservancy by municipalities in 1906 as compared with 1905, but a smaller outlay on water-supply and drainage. The actual sum spent on water-supply, drainage and conservancy during the year was £105,807. Improvement of the conservancy in towns continues to make progress and expenditure under this heading rose nearly everywhere. Eleven municipalities appointed surveying staffs for the preparation of surface drainage schemes and good progress was made with the drainage schemes in several other towns. The Khulna water-works were opened in October 1906 and the Monghyr water-works were nearly finished at the end of the year. The Bhagalpore water-works are to be remodelled at a cost of about £8,067. At Darjeeling, as the Pasteur-Chamberland system has been a failure, the existing settling tanks will be converted into sand filters. Bengal.

The Sanitary Board held four meetings during the year. The Board discussed rules for the preparation of water-supply and drainage projects and the subject of the employment of a permanent staff of surveyors for the preparation of sanitary schemes.

At Calcutta the whole of the new city outfall works of the Suburban Drainage Scheme have been taken over from the contractors and have proved thoroughly statisfactory and fully justified anticipations. West of Tolly's nullah, the sewerage system is in abeyance pending the construction of the much discussed syphon. Estimates for an overhead rising main and for an underground syphon were prepared and considered: the estimate for the former, including the capitalised value of maintenance charges, amounted to £51,515, and was rejected in favour of the estimate of £14,447, for the latter, which it is hoped will now be proceeded with rapidly. The sum originally sanctioned for this great drainage project was £434,698, and supplemental grants increased it to £457,746: the total expenditure up to the end of the year was £416,707. Attention was also devoted to other drainage works. Calcutta.

The scheme for the improvement of the city filtered water-supply was examined and at the close of the year plans and estimates for the entire scheme were under preparation, the drawings for the proposed overhead reservoir having been made by a special draughtsman. Meanwhile the conversion of the intermittent to the constant supply has been completed in the town proper and the period for the conversion in the added area has been extended to the 31st March 1909. The arrangements for the supply of water to the shipping have been greatly improved with beneficial results to the revenue. The conservancy arrangements are reported to have greatly improved and the improved process adopted for the disposal of carcases has proved satisfactory and free from nuisance.

The sum spent by the 44 municipalities in Eastern Bengal and Assam during 1905-06 under each of the headings water-supply, drainage, conservancy, markets and slaughter-houses, and construction of roads, was considerably greater than in the previous year. In many of the larger towns of the province schemes for water-supplies and drainage are under consideration and the improvement of conservancy and of market buildings are receiving attention. Eastern Bengal and Assam.

The Sanitary Board held five meetings during the year; the drainage of unhealthy areas and the improvement of water-supplies in rural areas were the principal subjects of discussion. An application for a whole-time Sanitary Engineer for the province was made and the creation of the appointment has been approved by the Government of India.

In the United Provinces of Agra and Oudh good progress is being made in the development of municipal sanitation, the cost of the projects of improvement considered by the Sanitary Board during 1905-06 being about 38 per cent. more than in 1904-05. The water-supply works at Agra, Allahabad, Benares, Cawnpore, Lucknow, Meerut and Naini Tal gave good results throughout the year. The scheme for extending the water works and providing electric light in Mussoorie and Landour made good progress. At Agra the length of drains flushed has risen to 42½ miles. At Allahabad a large drainage scheme is in preparation. At Benares the sewerage scheme has been completed at a cost of £88,802, and a further scheme to cost £138,197 for the sewerage and surface drainage of the rest of the city has been sanctioned. United Provinces of Agra and Oudh.

The Sanitary Board held four meetings during the year, and projects estimated to cost £172,728 were approved. It was noted that the expenditure on village sanitation was greater than in any former year. An Assistant Sanitary Engineer was appointed in January 1907.

Punjab. In the Punjab the drainage works at Jagraon, Gujrat and Sargodha were completed during the year and at Rawalpindi and Multan the construction of the main drain and disposal works were nearly finished. The construction of the intramural drainage at Delhi made good progress. The water-works at Sargodha were completed and work was begun on the water-works at Ludhiana.

Five meetings of the Sanitary Board were held during the year. The appointment of Sanitary Engineer for the province has been made permanent.

North-West Frontier Province. Progress in sanitation in the North-West Frontier Province was confined to minor improvements in the water-supplies, drainage and conservancy of the towns, and to the cleaning out of wells in the districts.

Burma. In 1906 the towns in Burma spent £274,453 on sanitary works. At Rangoon the Hlawga water-supply scheme was completed and handed over to the municipality, and at Akyab progress was made with the water-supply project. At Insein, Pegu and several other towns plans and estimates for water-supply and drainage schemes were prepared. The district municipalities spent only about 7 per cent. of their income on sanitary works.

The Sanitary Board held four meetings during the year.

Central Provinces and Berar. The district head-quarters municipalities of the Central Provinces and Berar in 1906 spent 39·49 per cent. of their total income on water-supply, drainage, conservancy, markets, slaughter-houses, and other sanitary requirements. No new work of importance was undertaken during the year, but in most of the towns considerable sums were spent in improving water-supplies, extending and renewing drains and other sanitary requirements.

Meetings of the Sanitary Board were held in all district head-quarters except Akola, Hoshangabad, and Nagpur. The work carried on under the direction of the Board consisted in the improvement of existing wells, the construction of new wells, the repair of roads, and the clearing of village sites. In 1906 the urgent necessity for the appointment of a Sanitary Engineer for the province was represented to the Government of India.

Madras. In the Madras Presidency the extension of the Coonoor water works and the erection of a pumping installation at the Arisipalyam tank in Salem were completed during 1906. The improvement of the head-works of the Guntur water-supply, the drainage works of Ootacamund, and the head-works of the Saidapet water supply project were under construction; and the Vellore, Gudiyattam, and Nellore water works were being constructed by the Public Works Department. A comprehensive scheme for the drainage of Madura, and plans and estimates for the water-supply of Berhampur, Periyakulam, Tuticorin and Tanjore extension were prepared.

The Sanitary Board reviewed a large number of schemes the aggregate cost of which was £402,627. Final approval was accorded to the plans and estimate of 31 works.

Madras City The new drainage works in Madras city were temporarily suspended in the middle of September 1906, the Engineer of the Corporation being called upon to submit, in consultation with the Sanitary Engineer, detailed plans and estimates for remedying the defects in the works already executed in the five sections of the city. Owing to the nuisance caused by the overflow of sewage into the Kelly drain the matter was given preference to all other drainage proposals and a satisfactory scheme was under active preparation during the last quarter of the year. Certain drainage works were completed during the year and repairs to several drains within the city were carried out. The five pumping stations for the new drainage works commenced pumping sewage to the Cassimode Farm in April 1906 and the old sewage farms at Mylapore, Kistnampet, Napier Park and DeMellow's Road were thrown out of use. It is considered probable that this measure has been one of the causes of the reduction of the death rate.

The scheme for a new filtered water-supply into the city at a cost of £157,333 was sanctioned by Government in March 1907 and formally accepted by the Corporation in April.

Bombay.

Progress in Municipal sanitation in the Bombay Presidency has been hampered by the continued prevalence of plague, the expenditure in connection with which has been such that in many municipalities urgent schemes for water-supply and drainage have had to be deferred. The total sum spent by the 162 municipalities during the year on water-supplies, drainage, and conservancy was £ 149,032. Three important works were in progress during the year, *viz.*, the Ahmedabad drainage and sewerage scheme, the Karachi drainage scheme, and the Jalgaon water-supply scheme. Projects for the improvement of the Dhulia water works and for the drainage of Pandharpur were sanctioned, and projects for the Poona and Kirkee water-supply and for the drainage of Poona were prepared. A considerable number of new works and improvements to existing works were considered.

The Sanitary Board held two meetings during the year. The chief matters considered were surveys for the improvement of the water-supply and drainage of the towns in the neighbourhood of Bombay City and the collection of information regarding municipal water-supply and drainage works.

Bombay City.

During the year the special and ordinary Branches of the Drainage Department in Bombay City were amalgamated and placed under one officer who was designated Deputy Executive Engineer, Drainage. The works in connection with the scheme for sub-soil and surface drainage and the Malabar Hill sectional sewerage works, commenced in previous years, were vigorously pushed forward. A settlement was arrived at regarding a long pending scheme for relieving the surcharge of sewers and early steps are to be taken in connection with certain works recommended by the Consulting Engineers. The water works were maintained in a fairly efficient state. The repairs to the Tulsi outlet tunnel undertaken in 1904 remained unfinished owing to the scarcity of labour. The rainfall of the year was fair compared with the quinquennial average and especially so compared with that of 1905 when it was very deficient. The number of water connections increased by 653 and now stands at 21,579. It is said that a good deal yet remains to be done to secure a better distribution of the water-supply in the city.

ABSTRACT OF THE REPORT OF THE SANITARY COMMISSIONER WITH THE GOVERNMENT OF INDIA FOR 1906.

Meteorology of the Year.

The following summary has been abstracted from the Monthly Weather Reviews for the year 1906, published by the Meteorological Department of the Government of India.

Chief features.—The cold weather season lasted longer than usual, and February and March were very wet months in northern India, where the seasonal rainfall was in very large excess.

There was a delay in the setting in of both monsoon currents over by far the greater part of the country, and the rainfall from June to September was in slight defect in the field of the Bay current, but was practically normal in the region usually served by the Arabian Sea current. The provincial departures from the normal were not large except in the case of Mysore (24 per cent. in excess) and Sind (31 per cent. in defect), and the rainfall of the whole country was in defect by 1 per cent.

Weather was drier than usual in October and November, but in December the Punjab and the Peninsula received rainfall in excess of the average, the excess being most marked in the Peninsula.

January.—Weather in Persia and northern India was on the whole slightly more disturbed than is usual in January, but with one exception the depressions travelling from the west, to which such disturbances in the winter months are chiefly due, were weak or met with conditions unsuitable for rainfall. An eastward travelling depression, however, which arose in Central India gave rain in the north-east; and a storm from the Bay, of a character very unusual in January, was the cause of the only wet weather which occurred in the south of the Peninsula. The following statement presents the average conditions that existed during the month:—

(i) The geographical distribution of pressure deviated only slightly from the normal, with tendencies to low pressure over the Peninsula, and thence northward across the Central Provinces, Chota Nagpur and Bihar up to the Himalayas, and to high pressure in north-west and north-east India. The mean geographical departure from normal for the whole area was +'002".

(ii) Maximum temperature was low in the areas of high pressure in north-west and north-east India, and high in the areas of low pressure; but the places were few in which the deviations exceeded 3°.

(iii) Minimum temperature showed the same distribution as maximum temperature, except in the north-east, where, in Bengal, it was practically normal, and in the east of the United Provinces, where it was distinctly in defect.

(iv) Rainfall occurred chiefly in the Peninsula, Bengal, the east of the Central Provinces and in the north-west submontane districts: humidity, both absolute and relative, and cloud presented similar features of distribution.

February.—The weather in northern India was abnormally cold, wet and cloudy, and a series of depressions of the winter type passed eastward from Baluchistan or the Arabian Sea across Gujarat, Sind or the North-West Frontier Province, accompanied by waves of hot and cold weather. There was also evidence of two other such depressions, with centres passing to the north of Kashmir. Rain or snowfall occurred with each of these, notably with the two last to which was due the larger part of the total rainfall of the month which, as has already been indicated, was very greatly in excess of the normal. Mean temperature was from 2° to 4° low over the whole of northern India, the maximum or day temperatures especially contributing to this result, and conditions of high humidity and excess cloud amount were nearly general.

March.—Weather in northern India presented the same cold, cloudy and damp features which had been prominent in February, and in all parts of the Peninsula also, except the extreme south, mean temperatures well below normal were recorded. Above latitude 22° N. the defects of temperature lay between 2° and 5°, and large tracts in the north-west and from Bengal westwards to the Central Provinces and the east of the United Provinces were uniformly 4° low in mean temperature. The greater part of this

result was due to deficiencies of maximum day temperature, which in consequence of cloudy weather ranged up to 8°. Rain continued, as in February, to fall in excess in the north, but in a less marked manner than during that month. In Burma, Assam, and on the west coast only were any deficiencies shewn. In the south rain fell on the Coromandel coast and in south Madras on the 1st, and scattered thunder-showers on the 18th and 19th. Humidity was high generally in the areas of rainfall, and cloud was in excess over the whole Indian area, except in parts of Bombay and Burma.

April.—Weather conditions presented a strong contrast to those of the previous month—the departure of mean pressure from the normal fell from +·048″ in March to —·007″ in April; rainfall was practically absent except in Kashmir, Assam and south India; and cloud was in conspicuous defect. Maximum day temperature rose above the normal over the whole of the Peninsula and Bengal, and minimum night temperature showed closely corresponding changes. Two depressions of the cold weather type crossed northern India in the first half of the month and strong evidences appeared of the passage of two others to the north of Kashmir. The rainfall due to them was confined to the extreme north-west corner of India, and to Bengal, Assam and northern Burma, the principal falls in the north-west occurring between the 4th and 9th and the 15th and 17th, and in Assam from the 2nd to the 3rd and from the 5th to the 7th.

A wave of very cold weather was affecting the west at the opening of the month and was felt in a modified degree in the United Provinces and Bengal, but it had given place to a warm wave by the end of the first week. This latter wave of high temperature was due to and preceded the third travelling depression of the month, and was followed by a marked low temperature wave giving total changes of 16° and 18° in the west between the 7th and 11th and of 6° and 8° between the 12th and 14th in Bengal. During the latter half of the month weather in the north-east was influenced by a trough of low pressure lying near the hills, which by directing the winds from Orissa along a more eastward course than usual raised the temperature in Bengal and maintained it at values from 4° to 10° above normal. Rain fell almost daily in Assam during the second and third weeks, heavy falls occurring on the 18th and 19th during a strong development of the low pressure area at the foot of the hills. In the Peninsula dry weather prevailed except in south India, where thunderstorms gave light scattered showers on many days and more general rain on the 27th, 28th and 30th. Temperature was a few degrees above normal over most of Bombay and Madras.

May.—The weather was warmer than is usual even in May, the warmest month of the year, the averages of both day and night temperatures having been almost generally above normal over India and Burma. In maximum temperature the greater part of the country showed an excess of about 2°, but in Burma, south India and the Central and United Provinces the excess reached 4°. Minimum temperature was above normal almost equally generally, the area of its greatest departure, which reached 6° covering parts of Rajputana and Central India. Cloud was conspicuously less than usual, and its distribution was similar to that of absolute and relative humidity, as measured at the ground level. Rainfall was nearly everywhere below the average, by amounts varying from 10 per cent. in Bengal and Orissa to 89 per cent. in the area comprising east Rajputana, Central India and Gujarat. In distribution it was concentrated, as is usual in May, over the north-eastern parts of India, the Malabar coast, and Burma, and the heavy falls which regularly occur in the extreme south of the Peninsula and on the Tenasserim coast graded off rapidly in a northward direction, in the Peninsula towards the area of dry weather, in north Bombay and in the south of Burma towards the interior.

June.—The chief feature of the weather of the month, the breaking of the monsoon, occurred later than the normal date over the greater part of India, most notably in Malabar, the Central Provinces and the east of the United Provinces. In these areas the delays amounted to 10, 10 and 12 days, respectively. The month's rainfall, due to unsettled conditions prior to the monsoon, and later, to the monsoon current itself, was deficient in Lower Burma, Bengal, Assam, a large part of the Punjab plains, in Rajputana, Central India and on the west coast, and was above normal elsewhere.

Three depressions developed during the month; the only one of importance crossed India, between the 17th and the 23rd, from the east coast to Sind, causing light, moderate and heavy rain along its course. Mean pressure was ·018″ in excess over India and Burma, and departures from this average condition were nowhere large. The monthly average of mean temperature was nearly normal, with a slight excess in part of Bengal and a slight defect in Upper Burma. The actual departures from normal, however, which

occurred from time to time during the month, were considerable in several parts of India. Humidity conditions were, on the monthly average, approximately normal; they showed however, an excess in Sind, Cutch and Rajputana, and a defect in the United Provinces and east Punjab.

July.—Weather was on the whole less cloudy than usual, rainfall was below the average, except in the Peninsula, and temperatures were normal over the greater part of the country. In the north-west, however, Sind and the Punjab had clearer skies, higher temperature and very considerably less rain than is usually the case in July. During the month three depressions affected the weather in the periods from the 1st to the 4th, from the 17th to the 24th, and from the 25th to the 29th. The first caused general and heavy rain in north-east India, the United Provinces, Central India and parts of the Central Provinces and Rajputana. The second depression gave an increase of rainfall over the whole of the Peninsula and caused rain over the greater part of northern India between Bihar and Rajputana. The third gave heavy rain from Bengal westwards to the central parts of the country.

August.—Weather was less cloudy than usual over the greater part of India and Burma, although at the ground level humidity was approximately normal. Mean temperature was slightly low along the base of the Himalayas and in the south-east of the Peninsula, owing chiefly to a defect of day temperature, and high in parts of Rajputana and the Punjab, but elsewhere mean monthly conditions were practically normal. Pressure was on the average high by ·031″ and its departures from normal varied from a small defect in the south to an excess of ·080″ at the head of the Bay of Bengal. Winds were weak in the Peninsula, but strong in Rajputana, the upper Sub-Himalayas and at the head of the Bay of Bengal. Rainfall was in excess along the base of the Himalayas, at Himalayan hill stations, and in the Peninsula, especially in the south. In the belt of the country between the Sub-Himalayas and the Peninsula rainfall was on the whole deficient. Two depressions occurred during the month, one in Gujarat between the 24th and 29th and the other, almost simultaneously, travelled from the Bay of Bengal across Orissa to Rajputana. In each case some heavy rainfall in the neighbourhood of the depressions was induced by the conditions prevalent at the time.

September.—Weather in the north-west and west-central parts of India was on the average of the month slightly cooler by day and the air damper than is usual in September; cloud was in excess in Rajputana and over a belt of country from Gujarat across the Central Provinces to Burma, and in defect in Bengal. In other parts of India conditions were approximately normal. Mean monthly pressure was low, especially in Bengal. Rainfall was light in Bengal, the Peninsula and Gujarat, but heavy in Burma and the area comprising the Punjab, Sind, Rajputana and Central India.

Five depressions occurred, the first of which was already filling up at the end of August. The second and third appeared between the 4th and the 15th and gave widespread rain over nearly the whole of India; the remaining two depressions together caused heavy rainfall between the 25th and the 30th in central and north-east India and in Burma.

October.—Skies were even more free from cloud than usual over a large part of the country, although humidity was above the normal in most places. Rainfall was somewhat irregularly distributed: it was above normal in the interior of Burma, the Assam Hills, the Brahmaputra Valley, Bengal, Chota Nagpur, Mysore and south Madras, and was deficient in the remainder of the country. The defect was greatest in the United Provinces, Berar and the central and western districts of the Central Provinces which received hardly one-tenth of their normal quantity. Nights were warmer than usual in most districts, particularly in upper India where minimum temperature was from 2° to 6° above the normal; while days were, if anything, slightly cooler than is normally the case. In the mountain zone, bordering upper India, temperature was high, both by day and night. One storm, of moderate intensity, occurred in the month, developing near the Andaman Islands between the 21st and the 27th. It travelled to the Madras coast at Cocanada, and thence moved slowly along the coast till its disappearance on the 31st and caused rainfall on the Circars coast, in Orissa and north-east India.

November.—On the average of the whole of India weather was drier and warmer and skies were clearer than is usually the case in November, and barometric pressure was in mean geographical excess by ·027″. Humidity was high in the north-west, north-east and south India, and low over the central parts of the country. Cloud amount was below normal everywhere except in the south and west of the Peninsula, central Burma and upper Assam. Temperature, both by day and night, was in excess over the greater

part of the country, most markedly in north-west India where it ranged up to ·6° above normal. The excess of pressure was higher in the hills of northern India than on the plains, so that the vertical pressure gradients were slighter than usual. Winds had a more westerly tendency than usual in northern India, and in the Peninsula shewed a strong north component. Rainfall was below normal except in Burma, Eastern Bengal and Assam and the south of Madras. The largest defect occurred in Mysore where only 25 per cent. of the normal quantity was received. No rain fell over the tract of country which includes the United Provinces, the Punjab, Rajputana, Central India, Sind and Gujarat.

December.—In northern India, with the exception of the Punjab, weather was drier than is usual in this month, but in the Peninsula conditions were disturbed, and the rainfall was in many parts in excess of the normal by between 200 and 900 per cent. Temperature, and especially minimum temperature, was high over the greater part of the country, and humidity was in most places above normal. Skies were much clouded in the area of rainfall in the Peninsula and also in the North-West Frontier Province, parts of north-east India and Burma, but elsewhere cloud proportion was lower than usual. Pressure was low on the average by ·013", the defect being chiefly noticeable in the Peninsula, and vertical gradients of barometric pressure in the northern parts of the country were less marked than usual. There were four periods of disturbed weather in the Peninsula, during which the greater part of the rainfall of the month within that area occurred; and in the north of India the conditions accompanying the winter type of depression appeared on four occasions, although on only one of these was the resulting precipitation at all abundant.

European Troops.

(For Statistical Tables, *see* pages 115 to 121.)

Sickness and mortality in 1906.—The average strength of the European army of India during 1906, excluding officers, was 70,272, and of this strength 51 per cent. were men under 25 years of age and 21 per cent. were men with less than one year's service in India. The year was an unhealthy one for all classes of people in India and from the statement below it will be seen that the rates of admission to hospital, of mortality, and of invaliding, among European troops were all somewhat higher than those of the previous year though they were considerably lower than those of the antecedent quinquennium.

India.	All causes. Ratios per 1,000.		
	1900-1904.	1905.	1906.
Admissions	1046·5	834·3	870·8
Constantly sick	64·6	52·3	51·4
Deaths	13·03	10·05	10·43
Invalids	34·76	21·24	28·36

Despite an increase in the number of cases of sickness the constantly sick rate fell from 52·3 to 51·4 per 1,000; and, in view of the fact that the rates of admission to hospital and of death during 1905 were the lowest on record, it must be concluded that the health of the British troops in 1906 was very good. The recorded increase in sickness was due chiefly to a rise in the number of admissions on account of ague; this disease, venereal diseases and simple continued fever were the chief causes of sickness during the year. As compared with 1905 there was a rise in the admission rates from ague, remittent fever and simple continued fever, and a fall in those from venereal disease, influenza and enteric fever.

The chief causes of death were, as usual, enteric fever and abscess of the liver, the former accounting for 30·6 per cent., and the latter for 14·6 per cent. of the total number of deaths. The mortality from each of the chief diseases, with the exception of heat-stroke, pneumonia and tubercle of the lungs, was higher than in the previous year.

The chief causes of invaliding were, in order, debility, ague, syphilis, valvular disease of the heart, enteric fever, and disordered action of the heart, these causes together accounting for 847 invalidings (nearly one-half of the total number) as compared with only 574 in 1905. The number of men sent home on account of syphilis rose from 75 in 1905 to 120 in 1906 and on account of enteric fever from 52 to 115, but there was a fall in the number invalided for tubercle of the lungs (from 116 to 92) and only 10 men were invalided for *Bilharzia hæmatobia* as compared with 23 in 1905, 71 in 1904 and 158 in 1903.

If the statements in the first paragraphs of this and the following section be compared it will be seen that the admission rate among European troops during 1906 was nearly one and a quarter times as high as that among Native troops, that the constantly sick rate was more than twice as high and that the invaliding rate was four times as high. The death rates among European and Native troops were, respectively, 10·43 and 6·57 per mille.

The average annual strength of the European troops composing the garrison in the Aden Hinterland during the first three months of 1906 works out to 79, and altogether 57 admissions into hospital and one death were reported. Ague as usual, was the chief cause of sickness; the death was due to syphilis.

Commands. Divisions. Stations.—Employing the statistical method usually adopted in this report for ascertaining which areas are most and which least favourable to the health of the troops, we find that of the three Commands the Western was the most unhealthy during 1906 both for European and for Native troops, and that for European troops the Eastern was more unhealthy than the Northern. The Western Command was the most unhealthy chiefly owing to the death rates on account of enteric fever, abscess of the liver and dysentery being higher than in the other Commands. Enteric fever was least prevalent and caused least mortality in the Northern Command and venereal diseases were also least prevalent in this Command. Tubercle of the lungs was most

prevalent in the Western Command, and pneumonia and influenza in the Northern. As regards the Divisions the statistics of the 5th (Mhow) Division were the least favourable during 1906, the rates of admission to hospital, of constantly sick, and of mortality being respectively 1,060, 55 and 16 per mille. The 1st (Peshawar) Division stands next in the list with an admission rate of 1,290, a constantly sick rate of 55 and a death rate of 8 per mille and the 9th (Secunderabad) Division next with rates of 927, 62 and 10 per mille, respectively. As in 1905, the health of the European troops in the 2nd (Rawalpindi) and the 3rd (Lahore) Divisions was better than in the other Divisions during 1906.

Among the larger stations the highest constantly sick rates were recorded at Fort William (88·2), Meerut (71·3), Wellington (69·4) and Rawalpindi (64), and the lowest at Sialkot (36). The incidence of enteric fever was greatest at Mhow, Jhansi and Lucknow, and of hepatic abscess at Sialkot, Mhow and Secunderabad. Fort William (34·45), Colaba (20·60) and Rangoon (18·09) furnished the highest constantly sick rates for venereal diseases and Quetta (4·61) the lowest.

Geographical groups.—The geographical groups which, as judged by the statistics of sickness and mortality in combination, may be regarded as having been most unhealthy for European troops during 1906 were Bengal-Orissa (IV), Central India (VIII), Burma Inland (II), Indus Valley (VII), and Deccan (IX), while at the other end of the scale were the hill stations (XII-*a*), the Burma Coast (I) and the Western Coast (X). Bengal-Orissa and Central India invariably appear in the list of unhealthy groups, and the hill stations in the list of healthy ones, but the position of the remaining groups as regards their healthiness differs from year to year and is dependent upon other factors than climate ; one is the figure representing the average strength, which in some groups is low [*e.g.*, Burma Coast (I), where it was only 1,375 in 1906] and a few deaths yield a high death rate, and in others high [*e.g.*, Upper Sub-Himalaya (VI), where it was 13,989]. The admission and constantly sick rates were lower than in 1905 in all the geographical groups except five, the three groups where the rates recorded during 1906 compare most unfavourably with those of 1905 being Burma Inland (II), Central India (VIII) and Southern India (XI). Ague was most prevalent among the troops located in the Indus Valley, the Central India and the Bengal-Orissa groups, simple continued fever among those in the Burma Coast group, influenza among those in the Indus Valley group, and enteric fever among those in the Central India group.

Influenza.—Influenza caused an admission rate of 11·4 per mille among the European troops during 1906 as compared with 14·2 per mille in 1905 and 4·9 per mille in 1904. The disease was prevalent in all the geographical groups, the incidence being greatest in groups VII (Indus Valley) and VIII (Central India). In the first of these the troops were affected to the extent of 65 per thousand of their strength and in the second to the extent of 23 per thousand. There were altogether 804 admissions to hospital, with no fatality, reported from 41 stations, of which Peshawar (313), Agra (119) and Cawnpore (86) contributed 64 per cent. of the total number of admissions. At Peshawar the epidemic lasted from May until October. The usual symptoms of the disease were present and in all cases the blood was examined microscopically in order to exclude malaria. From the sputum of one patient, in whom the disease was complicated with pneumonia, the influenza bacillus was isolated. At Agra the epidemic occurred during September and October ; the medical officer considered that the disease was probably imported from stations in the hills, where it had been prevalent during the summer. At Cawnpore influenza was prevalent during October and November.

Cholera.—There was a considerable increase in the prevalence of cholera among European troops during 1906, the number of cases recorded being 72 and the number of deaths 46 as compared with 10 cases and 9 deaths in 1905 and 16 cases and 11 deaths in 1904. Of the 72 cases during the year 21 (including 6 cases of "choleraic diarrhœa") with 9 deaths occurred at Meiktila, 11 with 10 deaths at Secunderabad, 9 with 7 deaths at Benares, 4 with 3 deaths at Dinapore and 11 with 8 deaths among troops on the line of march. The first patients in the outbreak at Meiktila were soldiers who had probably drunk milk or aerated waters in a billiard saloon in a bazaar where cases of cholera had occurred. It was found that the milk supplied to this saloon came from a district where cholera was severely prevalent among the cow-keeping community. The outbreak, which began on the 1st of August, was quickly checked by moving the affected regiment into camp and by the thorough measures of isolation and disinfection immediately undertaken. The outbreak at Secunderabad was confined to patients under treatment in the upper storey of the station hospital and all the cases occurred between the 4th and 16th of

August: Eight of the patients were suffering from enteric fever, two from simple continued fever and one from rheumatism. Only three of the patients attacked with cholera lived more than a day after the onset of symptoms. The source of infection in the first case could not be traced with certainty, but it was possible that it was a case of infection by milk, which, it appears, was obtained from native contractors and apparently was not boiled before issue to the patients. The wards of the upper storey were evacuated on the 12th or 13th of August and the last case occurred on the 16th. The outbreak at Benares lasted five days, from the 30th of May until the 4th of June. All the men attacked belonged to the same company and used the same latrine. It was found that one of the patients had visited a house in the bazaar where there were two cases of cholera and it was probable that he had taken food there. All the cases at Dinapore were among members of the Sergeants' mess and it was thought that infection had been conveyed in uncooked vegetables and fruit brought from a locality where cholera existed.

Small-pox.—There were in all 87 cases of small-pox with 4 deaths among European troops in 1906 as compared with 99 cases with one death in 1905, and 49 cases with 4 deaths in 1904. An examination of the records for the past ten years shows that there has been a considerable increase in the prevalence of this disease among European troops in India during recent years, for it appears that during the five-year period from 1897 to 1901 only 96 cases of small-pox with 11 deaths occurred among these troops while during the five-year period from 1902 to 1906 no fewer than 326 cases with 21 deaths were recorded. This is the more unfortunate since among the much larger body of Native troops the prevalence of small-pox has not increased. The lack of success in the prevention of this disease among European troops during recent years is further illustrated by the fact that while in each year from 1897 to 1902 small-pox was more prevalent among Native troops than among European troops, in each year from 1903 to 1906 it was more prevalent among European than among Native troops. An interesting table obtained from the office of the Principal Medical Officer in India gives the number of European soldiers who at the yearly examinations are found to have no satisfactory marks or record showing that they have been vaccinated, from which it appears that in 1906 the number was no less than 20,649 as compared with 14,923 in 1905, 6,529 in 1904, 5,987 in 1903 and only 2,463 in 1902. It can scarcely be necessary to search further for an explanation of the cause of the increase of small-pox among European troops in India. During 1906 one or more cases were recorded in 32 stations, the largest numbers occurring in Cawnpore (15), Jhansi (12) and Karachi (8). There was no death among the 15 patients who suffered from the disease in Cawnpore. All the men except one had been re-vaccinated at periods varying from two to eight years before the attack, but in nine only two marks had been made and in the remainder only three. In seven re-vaccination had "failed" and in three the result was recorded as "modified". There was one death among the patients at Jhansi; the man had been successfully re-vaccinated in 1902, three marks having been made. At Karachi also one case was fatal; the patient had been re-vaccinated in 1901 there being one satisfactory mark. Measures have recently been taken to ensure that failures in re-vaccination are not due to loss of potency of the vaccine.

Intermittent and remittent malarial fevers. Simple continued fever.—Malarial fevers were very prevalent among all classes of people in India during the latter part of 1906 and the number of admissions to hospital on account of intermittent fever among European troops rose from 7,945 (111 per mille) to 12,380 (176 per mille). The number of deaths ascribed to this disease was 16, which is equivalent to a death rate of .23 per mille as compared with .11 per mille in 1905. Native troops and prisoners also suffered more severely than in the previous year. As regards the prevalence of the disease among the European troops of the three Commands it may be noted that in the Northern Command the admission rate rose from 70 per mille in 1905 to 226 per mille, in the Western from 163 to 250 and in the Eastern from 113 to 132. As regards the ten Divisions the admission rates from malarial fevers (intermittent and remittent) were highest among the troops of the 1st (Peshawar) Division (686 per mille of strength), the 5th (Mhow) Division (349·7 per mille), and the 4th (Quetta) Division (207·1). The rates in these three Divisions during the previous year were 178·9, 184·3 and 123·8 per mille respectively, which shows the great increase in prevalence during the year under review.

As regards the relative prevalence of malarial fevers in the different geographical groups the admission rates among both European and Native troops were highest in the Indus Valley group (VII), the rates in the Central India group (VIII) coming next and those in the Bengal-Orissa group (IV) next. Finally as regards the relative prevalence of these fevers in the different stations it may be noted that excluding the Hill stations

(in which, of course, the admissions are almost entirely on account of relapses of infections contracted in the plains) an increased prevalence among European troops as compared with 1905 was recorded in 42 stations and a diminished prevalence in 25; and that, omitting stations with an average strength below 200, the highest rates were recorded among European troops in 1906 at Delhi, Jhansi, Peshawar, Nowshera, Hyderabad (Sind), Nasirabad and Neemuch, the rates in all these stations being above 500 per mille of strength and being considerably higher than those of the previous year.

The number of admissions recorded under the heading remittent fever during 1906 was 240 (3·4 per mille) and the number of deaths five as compared with 161 admissions (2·3 per mille) and one death in 1905. No fewer than 178 of the admissions during 1906 were recorded in Maymyo; the next highest numbers in any station were nine at Neemuch, eight at Port Blair, six at Mhow and four each at Ambala and Saugor. In eight stations only one case occurred, in four two cases and in four three cases. This list includes all the stations in which a case was recorded. All the cases at Maymyo were considered by the medical officer to be malarial fever; they were returned under the heading remittent fever in accordance with the character of the temperature chart. A similar remark applies to the cases at Neemuch, Port Blair, Mhow and Ambala. Except Mhow none of the stations at which cases of remittent fever were recorded come in the list of stations where malarial fever was most prevalent during the year and the inconsistency in the statistics of this disease from year to year shows that the return of cases under this heading depends more upon the idiosyncracy of the medical officer than upon any other factor. For this reason it is fortunate that the term has been omitted from the new edition of the Nomenclature of Diseases and after 1907 it will not be used in statistical returns.

The table below shows the extent to which the admissions recorded as due to simple continued fever have increased during recent years, an increase which is coincident with a decrease in the number of admissions recorded as due to intermittent and remittent fevers.

SIMPLE CONTINUED FEVER, EUROPEAN TROOPS.

Years.	Number of admissions.	Admission ratio per mille.
1902	846	14·0
1903	1,300	18·5
1904	1,684	23·7
1905	3,415	47·9
1906	3,917	55·7

There is no doubt that the increase is the result of a change in diagnostic procedure and that in former years a great number of the cases now shown under the heading simple continued fever would have been returned under the heading ague. The truth of this will be apparent from a consideration of the following table which gives the number of admissions recorded as due to malarial fevers and to simple continued fever in some stations during the years 1901-02 and 1905-06.

TOTAL ADMISSIONS. EUROPEAN TROOPS.

Stations.	1901 AND 1902.		1905 AND 1906.	
	Malarial fevers.	Simple continued fever.	Malarial fevers.	Simple continued fever.
Rangoon	357	23	72	388
Lahore Cantonment	1,291	35	210	432
Sialkot	419	1	176	222
Jubbulpore	392	28	110	279
Secunderabad	453	95	202	363
Bangalore	298	21	323	163
Quetta	647	113	476	777
TOTAL	3,857	316	1,569	2,624
Proportion	*100* :	*8·2*	*100* :	*167·2*

The years 1903-04 were apparently a "transition period" during which the opinion was gradually gaining ground that a number of cases of "fever" among European troops are not malarial in origin, and for this reason the statistics of those years are omitted. It will be seen that in these stations the number of admissions recorded as due to malarial fevers during 1905-06 was less by 2,288 than during 1901-02, but that the number recorded as due to simple continued fever was greater by 2,308, so that the total number recorded under both the headings was about the same in the two periods (that is it was 4,173 in 1901-02 and 4,193 in 1905-06). The more frequent use of the microscope in the diagnosis of malarial fevers, and, in places where anti-malarial operations are being carried out, the desire to make the results appear as favourable as possible have led to similar changes in diagnosis in other countries besides India, and such changes have to be taken into account in estimating the significance of a reported reduction in the prevalence of malarial fevers in any place. The great attention now being paid to the correct diagnosis of cases of "fever" is one of the most satisfactory results of the anti-malarial campaigns in force in most tropical countries and is to be encouraged in every way, but it has to be borne in mind that the statistics of the prevalence of malarial fevers in any place in which the newer methods of diagnosis have been instituted are not comparable with those recorded before microscopes were generally used in diagnosis. In favour of the view that the majority of the cases returned as simple continued fever in India are not malaria the statistics of 1906 are so far satisfactory in that the seasonal incidence of simple continued fever does not correspond with that of malarial fever. For India as a whole the months of greatest prevalence of simple continued fever were from May to September with July as the month in which the largest number of admissions were recorded. The stations in which most cases occurred during the year were Quetta (398) in which the month of maximum prevalence was September, that for ague being November, Secunderabad (257), the month being August as compared with December, Rangoon (222), the month being May as compared with July and September, Rawalpindi (220), the month being May as compared with November, Ferozepore (182), the months being July and October respectively, and Lahore Cantonment (179), the months being April and October respectively.

Reports by medical officers on simple continued and malarial fevers.—The much more frequent use of the microscope in diagnosis and the changes which are apparent in the statistics of malarial fevers and of simple continued fever indicate that success is attending the attempt to ascertain the true place which malaria should take as a cause of sickness among European troops. It is realized that a considerable proportion of the sickness formerly ascribed to "ague" is due to a variety of causes none of which, however, have any connection with malaria. The heading under which these non-malarial cases of sickness are returned most frequently is simple continued fever. For the most part they are cases in which there is fever for two or three days without any other prominent symptom and they are classified by most medical officers according to their cause. Thus the medical officer at Rangoon recognises the four following varieties: (1) cases due to constipation and indigestion; (2) cases occurring in men who are taking a great deal of exercise and living upon a too highly nitrogenous diet; (3) cases due to exposure to the sun but which are not sufficiently severe to be returned under the heading heat-stroke; (4) cases of the bilious type, due to congestion of the liver. In general these are the varieties recognised by most medical officers of experience although some lay most stress upon exposure to the sun as a factor in causation, others upon congestion of the liver and indigestion as a result of errors in food and drink. In some stations, as in Lahore Cantonment, the headings simple continued fever and congestion of the liver are used alternatively for these cases. Most of the admissions occur not during the malarious season but during the hot dry months of the year and doubtless exposure to great heat and errors in diet are both important factors in causation. Soldiers newly arrived in the country and those who are more than usually careless as regards the sun are especially liable to be attacked. The factor of errors in diet is referred to by many medical officers, but the opinions of only a few can be mentioned here. The medical officer at Rawalpindi (where there were 220 cases) says that moderate eaters do not suffer, but only those who have no control over their appetites; he considers that the large amount of nitrogenous food which soldiers consume, often in an unsuitable form, is an important factor in causation. The medical officer at Fort Lahore considers that the prevalence was aggravated to a great extent by over-eating and in some instances by over-drinking,

and says that most of the cases occurred among men who frequented the canteen daily. A similar opinion is expressed by the medical officer at Lahore Cantonment (Mian Mir) where 179 cases were recorded. At Secunderabad the great majority of the cases (of which there were 257) were associated with congestion of the liver and were considered to be dependent upon this condition. So far as true malaria is concerned it may be noted that in 3,611 cases during 1906 as compared with 2,797 during the previous year and only 705 during 1904 malarial parasites were found, and the species of parasite determined, by microscopical examination of the blood. The results show that nearly 80 per cent. of the cases during 1906 were infections with the *benign tertian* parasite as compared with 85 per cent. in 1905 and 83 per cent. in 1904, and that about 20 per cent. were infections with the *malignant tertian* parasite as compared with 11 per cent. in 1905, and 16 per cent. in 1904. *Quartan* parasites were found in only about 13 cases during 1906. The practice of returning as malarial fever only those cases in which malaria parasites are found in the blood is now adopted in many stations and doubtless accounts in part for the recorded reduction in malaria. Another factor which has affected the statistics is the system of "treatment in barracks" which was introduced at the end of 1903. During 1906 there were 4,317 cases of ague so treated, and these are not recorded as admissions to hospital; if they were, the admission rate from ague among European troops in 1906 would have been 237·6 per 1,000 instead of 176 and from simple continued fever it would have been 68·8 instead of 55·8. In these circumstances it must always be difficult to estimate by statistics the effect of the anti-malarial operations which are being carried out. A measure which has doubtless effected a real reduction in the number of admissions to hospital for malaria is the "after-treatment" now given in nearly all stations to patients who have been admitted for this disease. A nominal roll of these patients is kept at the station hospital and they are required to attend twice weekly for from six weeks to two months to receive a dose of quinine. The dose given during 1906 in the great majority of stations was 10 grains, but at Sialkot, Mhow, Kamptee and a few other stations it was 15 grains and at Nowgong 20, and these larger doses are doubtless more effective. Medical officers at stations where this "after-treatment" has been thoroughly carried out invariably report that it has caused a marked decrease in the number of re-admissions for relapses, which, as is well known, are the main cause of the high malaria ratios in certain stations. As regards the prevention of primary attacks there can be no doubt that the efforts put forth during the past year have been more general and more complete than formerly. "Mosquito brigades" were organized in nearly all stations in the plains and carried on a systematic campaign throughout the year. In the larger stations such as Peshawar, Rawalpindi, Lahore Cantonment (Mian Mir), Meerut, Mhow, etc., the cantonment was mapped out into separate areas each under the charge of a medical officer with one or more hospital assistants or trained soldiers and a gang of coolies working under his direction. In this way the whole cantonment could be gone over at least once a week, and all collections of water dealt with. At Mandalay a crude petroleum known as "earth oil" was used as a larvicide instead of kerosine oil; it is cheaper and was found to be quite as effective. At Deolali and Kamptee the petroleum known as "pesterine," which could be obtained at 6 annas a gallon was found to be a very effective larvicide. Anopheles mosquitoes were found in 38 stations in the plains, but the species were identified in only 19. *A. rossi* and *A. culicifacies* were the two species most frequently found. In a few stations the campaign against mosquitoes was reported to have been fairly successful, but in the great majority little or no effect was produced. The rainfall of the year was abnormally heavy and added great difficulties to the work in most stations. The medical officer at Rawalpindi reported that owing to the heavy rainfall the cantonment was covered with long rank vegetation which concealed numerous pools and other breeding places which the four mosquito brigades could not deal with effectually. Anopheles mosquitoes were present in enormous numbers at Peshawar, and although a mosquito brigade was organized in connection with each regiment and the cantonment sub-divided into small areas for the more effective control of all breeding places it was found that, owing to the difficulty of dealing with the numerous canals and ditches, little or no effect on the number of mosquitoes was produced. At Ferozepore the effect of the operations carried on by the mosquito brigades, as judged by the prevalence of malaria in 1906 and 1905, respectively, was recorded as a "total failure". At Roorkee anopheles mosquitoes were very prevalent and rain-formed pools were so numerous that it was impossible to keep them oiled constantly. The Ganges canal was not running for some weeks and mosquitoes bred "in millions" in the pools left in the canal bed. At Barrackpore the campaign had to be stopped during the rains as the numerous pools could not be dealt with at a reasonable cost. At Mhow and

some other stations the proximity of native bazaars rendered the efforts to reduce the number of mosquitoes ineffective. The medical officer at this station and many others considered that quinine prophylaxis is the best system for reducing the amount of malaria among the troops. This measure alone, or with others, was carried out in 42 stations. The dose, the frequency of administration, and the method adopted for ensuring that the men take the prophylactic dose varied considerably in different stations. In about 20 stations 10 grains of quinine were administered on two successive days each week; in Sialkot, Amritsar, Mhow and Belgaum 15 grains were given twice a week, in Kamptee 15 grains once a week and in Meerut (to one regiment) 15 grains three times a week. In Ahmedabad and Rangoon 10 grains were given three times a week, and in Saugor the same dose once a week. In Muttra, Allahabad, Quetta and Jubbulpore the dose was 5 grains given twice a week and in Shahjahanpur the same dose once a week. In Hyderabad the dose was 8 grains once a week, and in Karachi 6 grains. Mention is made that the doses were administered under the supervision of a medical officer or of an assistant surgeon in only about 15 stations and it appears that the measure is still carried out under regimental arrangements in a number of stations. A method of prevention which was adopted in several stations with excellent results and certainly merits further trial in future years was that of removing regiments severely attacked by malaria into camps situated at some distance from their barracks. The measure is practically the same as that known under the term "Segregation of Europeans". It was tried at Rawalpindi, Jhansi, Maymyo and Delhi, in every case with good results. It is well worthy of trial as regards the European troops in Lahore Cantonment (Mian Mir), where malaria is prevalent during only a short period of the year. In this cantonment extensive anti-mosquito operations (which included the stoppage of all irrigation since August 1905 and great improvements in surface drainage) have been carried on for several years. It is too early yet to judge of the effect of these measures.

Malta Fever.—Seven admissions to hospital during 1906 were due to Malta fever as compared with four in 1905, six in 1904 and nine in 1903. The stations at which the cases occurred in 1906 were Wellington, Ambala, Sialkot, Lebong, Lucknow, and Shahjahanpur. The patient at Wellington had been transferred from Bellary. He had not been at Malta or a Mediterranean station for nine years. The clinical symptoms were said to be typical and the blood agglutinated the Micrococcus melitensis in a dilution of 1 in 80. The patient at Sialkot apparently contracted the infection in the station. In this case and in the case at Lucknow the diagnosis was confirmed by the isolation of the micrococcus. The patient at Shahjahanpur had arrived from Malta eight months previous to his attack. The diagnosis was doubtful in the case at Lebong, and of the case at Ambala no particulars are given by the medical officer.

Enteric Fever.—Recent Investigations.—[The usual account of the more recent work upon enteric fever, which includes this year a summary of the results obtained by a committee of investigation working at the Central Research Institute, Kasauli, is omitted from the present abstract.]

Preventive measures.—The measures of prevention of enteric fever are sufficiently obvious, but are difficult to carry out. They depend upon a realization of the facts that infection takes place through the mouth, that every case of typhoid fever arises from a previous one, that the typhoid bacillus escapes from human beings in all the excreta but especially in the urine and fæces, and that the saprophytic life of the bacillus outside the human host is very short. Man is the only known host of the bacillus and the point of greatest importance in prophylaxis is the prevention of the spread of the living bacillus by him. If this can be completely effected the further spread of the disease is impossible for any bacilli which have previously escaped will die out within a short period of time. Thus the two conditions to be fulfilled in a successful campaign against typhoid fever are, firstly, to be in a position to discover all cases of the disease easily and at as early a stage as possible and, secondly, to be in a position to destroy the bacillus in these cases. It is in the carrying out of the measures necessary for the fulfilment of these two conditions that the difficulties arise, but that they are less great as regards a body of men, such as the European army in India, under complete military and medical control than as regards the ordinary civil population of any country there can be no doubt, and the success which has attended the measures on these lines for the suppression of typhoid fever in many civil districts in Germany, raises the hope that when they are effectually put into force in the European army in India the prevalence

of typhoid fever among this body of men will decrease very considerably. The expense of establishing a large hospital in the hills where convalescents could be kept until they had ceased to excrete the bacilli in their urine and fæces and the expense of the staff of bacteriologists who would have to be constantly employed would necessarily be great, but it would be more than compensated for if the prevalence of a disease which causes so much sickness, mortality, and loss of service, could be materially diminished.

Reports from medical officers.—Of the 102 stations occupied by European troops during 1906 there were only 15 in which more than 20 cases of enteric fever occurred and there were 8 in which only 2 cases occurred, 16 in which only one case occurred and 17 in which no case occurred. It is plain, therefore, that in the majority of stations enteric fever does not occur in the form of well marked epidemics and in view of the difficulties which attend the investigation of the origin of sporadic cases occurring at considerable intervals it is not surprising that the medical officers in at least 22 stations during 1906 stated that they had failed to trace the source of origin of attacks, and that a guarded opinion was given by the medical officers in a number of other stations. But although it is not often possible to come to a definite decision as to the origin and mode of spread of enteric fever in Indian cantonments the careful enquiries and investigations which are made in every case reveal many sanitary defects and lead to a clearer view of the relative importance of the different conditions which influence the prevalence of the disease. One of the most important conclusions to which these enquiries and investigations have led is that water plays only a very minor role in the dissemination of enteric fever among European troops in India. As regards the year 1906 if we except an instance at Saugor where it was thought the patient may have contracted the infection by drinking water from a well in a native city, one at Calcutta where the attack commenced some days after the patient had drunk water in a native house, and a very few isolated cases attributed to drinking water from *nullahs* or village wells while on manœuvres or on the line of march, in none of which is there any good reason for connecting the attack of enteric fever with the water drunk, we are left with only one outbreak in which there was a suspicion that the disease was water-borne. This outbreak (of 25 cases) occurred in Peshawar between the 23rd of May and the 30th of June, and all the regiments in the garrison were affected. It was found that the filter-bed was not working satisfactorily and that the contractor had obtained sand from a *dhobie's ghât* which was grossly dirty. The epidemic ceased within three weeks of the filter being put out of use. As regards conveyance by milk it may be noted that an outbreak of 14 cases which occurred at Ferozepore between the 21st of April and the 19th of May was considered to have been milk-borne and that a few cases at Rawalpindi, Secunderabad, Sitapur, Agra and Lucknow were also attributed to infected milk, but in all these cases as well as in the outbreak at Peshawar which has just been referred to, the evidence is much wanting in conclusiveness. As has been the case during the last few years the reports of 1906 show that medical officers consider contact infection, direct and indirect, to be the most important mode by which enteric fever is spread in Indian cantonments and although vigorous measures to guard against it are taken it was a potent factor in many stations during the year. A few examples taken from the reports may be mentioned. At Lahore Cantonment, Cherat, Nowgong and several other stations, hospital orderlies who were nursing enteric fever patients were attacked with the disease, the total number of cases among these orderlies amounting to 13. The Sanitary Officer of the Northern Command, Major Scott, R.A.M.C., investigated an outbreak which occurred in Lahore Cantonment during December 1905 and January 1906 and came to the conclusion that excluding the first patients, who, in all probability, had become infected from some source outside the cantonment, water, milk and flies could be excluded as factors in the spread of the disease and that personal contact was the most important means. Two of the patients were on duty as nurses in the enteric fever ward. Major Scott also investigated an outbreak at Dera Ismail Khan, where it seemed probable that infection had been conveyed indirectly by a sweeper who worked in the regimental hospital and in the bungalows occupied by the persons who were attacked. The danger that convalescents may spread the disease by direct and indirect contact is well recognised, and measures to guard against it are taken in all stations. At Rawalpindi such patients were not allowed to enter the barracks at all after their illness but were sent straight from the hospital to a convalescent depot in the hills and the medical officer considered that the absence of the usual autumnal rise in the prevalence of enteric fever was due to this measure. A similar plan was adopted at Belgaum. Patients in an early stage of the disease are more difficult to deal with and there are many instances in the reports which show the difficulty of discovering cases at a sufficiently early stage to prevent them

from spreading infection. In Lahore Cantonment the usual daily medical inspection of "contacts" revealed the presence of enteric fever in three men who declared that they were quite well. At Mhow 6 cases were definitely traced to infection from a patient who began to feel ill on the 9th of February but did not report sick until the 16th; another patient at this station began to feel ill on the 14th January but did not report sick until the 22nd. The reports from Neemuch, Rawalpindi and other stations also contain evidence that men abstain from reporting themselves to be ill as long as possible. Some of the cases at Peshawar were so mild that they would not have been diagnosed as enteric fever if a positive result had not been obtained with the agglutination test. An interesting instance of infection by direct contact with a bacillus-carrier is reported from Kasauli where enquiries as to the mode of origin of cases of enteric fever in a child and in a woman led to the examination of the child's mother, when it was found that although she felt quite well she was excreting typhoid bacilli in great abundance in her fæces. It appeared that she had come into contact with patients suffering from enteric fever at Agra, but that her infection with typhoid bacilli had caused no symptoms except slight looseness of the bowels which she noticed on arrival at Kasauli. The woman who had been admitted into hospital for enteric fever at Kasauli was a friend of hers and both she and the child had doubtless been infected by direct or indirect contact with her. Other examples of cases contracted by contact are to be found as usual in a number of instances in which infection was thought to have been contracted in latrines and by contaminated cooking utensils and food. The danger of "latrine infection" is said to have been greatly lessened in many stations by the use in the latrine pans of a solution of carbolic acid or perchloride of mercury instead of dry earth, and to this measure also is attributed a great diminution in the number of flies present in the latrines. Flies were regarded as the chief agents by which enteric fever was spread in Barrackpore, Indore, Kamptee, Nasirabad, Jhansi, Poona and a few other stations. Lieutenant-Colonel Meek, R.A.M.C., the Sanitary Officer of the Western Command, investigated the outbreak of enteric fever at Jhansi and found no reason to attribute its origin to infected water or milk, and the outbreak had not the characters of a water-borne epidemic. It cannot be said that his report contains any evidence which can be regarded as conclusive, but it seemed to him most probable that flies, which were exceedingly prevalent during July and August, were chiefly responsible for spreading the disease. Both flies and dust were considered to be important factors in the spread of enteric fever at Delhi, Mhow and Jubbulpore; and at Quetta, Muttra and Lucknow infected dust alone was held responsible. Major Morgan, R.A.M.C., the Sanitary Officer of the Eastern Command, investigated the mode of spread of enteric fever at Lucknow. He considered that water, aerated waters, milk, food, personal contact and infected clothing could be excluded, and that infected dust had been the main factor in the spread of the disease. He reported that the soil was dry and sandy, that the floors of many of the latrines and urinals were not paved and were much polluted, and that dust-storms were frequent. At Chaubuttia and Jhansi one or two cases were attributed to eating salad bought from natives and at Khandalla one case was thought to have been contracted in Bombay by eating oysters. Finally there is, as usual, a list of stations in which it was thought that some of the patients had become infected in native bazaars and a longer list of stations where all or nearly all the cases had been contracted on the line of march, or in camp, or on a railway journey, or in a station other than that in which the patients became ill. The fact that 20 of the 28 patients who suffered from enteric fever in stations in the Murree hills were admitted into hospital within 26 days of their arrival illustrates the danger of infection during the annual move by route march from the plains to the hills.

Enteric fever in 1906.—The statement below shows at a glance the number of admissions to hospital, the number of deaths and the admission and death rates per 1,000 of average strength recorded from enteric fever among European troops in India during each of the last five years.

Years.	Admissions.	Deaths.
1902	1,012 16·7	260 4·29
1903	1,384 19·6	295 4·19
1904	1,395 19·6	267 3·76
1905	1,146 16·1	213 2·99
1906	1,095 15·6	224 3·19

On the whole the record, especially if it be compared with that of the preceding five years (from 1897 to 1901), is distinctly encouraging and there is reason to believe that the prophylactic measures now in force are meeting with a measure of success. The average duration of a case in 1906 was about 75 days, in 1905 about 70 days, in 1904 about 68 days and in 1903 about 54 days, and this progressive increase in the duration of stay of patients in hospital is doubtless due to a more thorough appreciation of the necessity of keeping convalescents segregated from their comrades in barracks as long as possible. This practice causes, of course, an increase in the constantly sick rate and in the figure showing the total loss of service due to enteric fever [the average number of men constantly sick on account of enteric fever in 1906 was 224·11 and the total loss of service due to the disease was 81,800 days as compared respectively with the figures 210·36 and 80,482 in 1905], but in the end it cannot fail to reduce materially the number of new infections. The case-mortality was slightly higher than in the previous year, namely, 16·7, as compared with 15·5. It is evident from the reports of medical officers that the fatality of the disease would be much lessened if men could be induced to report sick at an earlier stage of the attack, and in this matter as well as in the discovery of mild ambulant cases and of convalescents who are still excreting the bacilli a great deal still remains to be done.

Enteric fever in Commands, Divisions and Geographical groups.—The disease was more prevalent and fatal in the Eastern and Western Commands than in the Northern. As regards Divisions its incidence was greatest among troops in the 5th (Mhow), the 9th (Secunderabad), the 7th (Meerut) and the 8th (Lucknow) Divisions and least among troops in the 10th (Burma) Division. As regards geographical groups the admission rates in the Central India (VIII), Gangetic Plain (V) and Deccan (IX) groups were highest during 1906, the prevalence in the first two of these groups being considerably greater than in the previous year. In the group of Hill Stations (XII-*a*) the admission rate fell to 7·3 per 1,000 as compared with 10·9 per 1,000 in 1905 and 14·7 in 1904. No case occurred in the Burma Coast group (I) during 1906.

Enteric fever in stations.—Admission rates of over 20 per mille were recorded in 31 stations during 1906 as compared with 25 during 1905. The following is a list of stations at which the highest rates were recorded:—

In group VI.		In group V.		In group VIII.		In group IX.	
Amritsar	59·7	Sitapur	51·7	Deesa	62·5	Jubbulpore	31·9
Fort Lahore	56·1	Lucknow	36·0	Mhow	42·5	Poona	29·2
Ferozepore	29·5	Fatehgarh	26·2	Nowgong	41·4	Secunderabad	28·4
Lahore Cantonment	28·0			Jhansi	41·2		
Meerut	24·5			Agra	34·8		
				Neemuch	29·4		
				Muttra	27·8		

The stations where the largest number of cases occurred were Secunderabad (92), Lucknow (90), Mhow (77), Poona (54), Meerut (50), Bangalore (47), Jhansi (44), Rawalpindi (41), Agra (38) and Peshawar (34). The points of interest in connection with the prevalence of the disease at these and other stations have been dealt with in a previous paragraph.

Relation of enteric fever to age and length of residence in India.—In 1906 the greatest liability to suffer and die from enteric fever fell upon the age period 20-25 and upon the first two years of Indian service. This is indicated in the statistics by the fact that nearly 69 per cent. of the total admissions at all ages were among men up to 25 years of age and that nearly 57 per cent. of the total admissions were among men during their first two years of Indian service. The admission rate among men over 35 years of age was 4·7 per mille as compared with 4·2 in 1905 and 4·0 in 1904; and among men with five years' service and upwards it was 7·0 per mille as compared with 6·9 per mille in 1905.

Plague and some other general diseases.—Among European troops in India there were recorded in 1906, 17 cases of plague and two deaths; in 1905, 13 cases and four deaths; and in 1904, two cases and no death. Of the 17 cases seven occurred at Fort William, four at Cawnpore, three at Poona, two at Mhow and one at Bombay. Six of the patients at Fort William had come from Mauritius and had inguinal buboes before

their arrival in Calcutta—there was some doubt about the diagnosis and the bacteriological examination and the results of inoculation experiments were negative. At Cawnpore plague was prevalent in the city and cantonment, but the exact source from which the patients became infected was not discovered. The type of the disease was bubonic and the plague bacillus was found in each case. All the patients recovered. The three patients at Poona contracted the disease in the native bazaar, where plague was very prevalent. The bacillus was isolated in each case. In one of the cases at Mhow the type was pneumonic and this patient died. The bacillus was isolated in all cases. The source of infection was not discovered in the case at Bombay and there was some doubt about the diagnosis as the bacillus could not be isolated from the blood stream or from the glands. There were altogether 60 admissions on account of measles, the majority occurring in the Eastern and Western Commands. Erysipelas accounted for 15 cases with no fatality. Of the 50 admissions (with three deaths) on account of beri-beri no fewer than 32 (with two deaths) were recorded at Aden; there were four admissions at Chakrata and three (with one death) at Rangoon. Twenty-six of the cases at Aden occurred in one regiment which had arrived from Burma in December 1905. The patients at Chakrata came from Cawnpore, where a small epidemic had occurred in the previous year. There were 282 cases of dengue with no fatality as compared with 415 cases with one death in 1905 and 439 with one death in 1904. The disease was practically confined to Fort St. George (Madras) where there were 182 cases, Rangoon where there were 63 and Karachi where there were 33. *Bilharzia hæmatobia* accounted for only nine admissions to hospital as compared with 22 in 1905, 63 in 1904 and 318 in 1903; and the number of men invalided for this cause fell from 23 in 1905 to 10 in 1906.

Tubercle of the lungs.—The admission rate on account of tubercle of the lungs among European troops fell from 2·1 per mille in 1905 to 1·6 per mille in 1906 and the death rate from ·28 to ·17. The admission rate in the Western Command (1·9 per mille) fell to about half that of the previous year; the rate in the Northern Command fell from 1·7 to 1·5, and the rate in the Eastern Command remained unchanged. The total number of cases treated for this disease during the year was 138 and the total number of deaths 12, the stations from which the largest number of admissions were reported being Rawalpindi (8), Poona (5) and Lucknow (5). The number of men invalided fell from 116 in 1905 to 92. The death rates from tubercle of the lungs among European troops, Native troops, and native prisoners during the year were in the proportions of 1, 3, and 21 as compared with 1, 2, and 13 in 1905.

Pneumonia and other respiratory diseases.—In 1906 the admission and death rates from pneumonia were 3·4 and ·28 per mille, respectively, as compared with 4·1, and ·63 in 1905, the total numbers of admissions and deaths in each year being respectively 241 and 20 in 1906, and 296 and 45 in 1905. The disease was most prevalent during the year among troops in the Northern Command and least so among those in the Western Command and as regards geographical groups it was most prevalent among troops in groups IV (Bengal-Orissa), XII *b* (Hill Depots), VIII (Central India) and VI (Upper Sub-Himalaya). Compared with the previous year there was an increase in prevalence in five of the geographical groups and a decrease in seven. Excluding stations where the strength was low the highest admission rates for the year were recorded at Campbellpore (27·8 per mille), Agra (10·1), Multan (9·5), Nowshera (7·8), Darjeeling (7·8) and Rawalpindi (7·8). For India as a whole the months of greatest prevalence are, as a general rule, December, January and February, and those of least prevalence June, July, August and September; during the year under report most cases occurred in January and fewest in August.

There was a decrease in the admission rate on account of "other respiratory diseases," the rate being 20·3 per mille as compared with 23·0, but the death rate was ·09 per mille as compared with ·06. The admission rate was lower than in 1905 in all three Commands, the greatest decrease being in the Western Command, where the rate fell from 26·4 to 20·6. The highest rate (21·8) was in the Eastern Command. The geographical group in which these diseases were most frequent during the year was XII*b* (Hill Depots), group VI (Upper Sub-Himalaya) coming next; and the stations (excluding those with an average strength below 150) where admission rates above 40 per mille were recorded were Dum Dum, Wellington, Chakrata, Nowgong and Meerut. Of the six deaths from diseases under this heading one was due to broncho-pneumonia, one to gangrene of lung, and two each to pleurisy and empyema.

Dysentery and diarrhœa.—Among European troops as well as among Native troops dysentery was more prevalent and caused a higher mortality than in 1905. The admission

rate among European troops rose from 13·4 per mille in 1905 to 15·2 per mille in 1906 and the death rate from ·46 to ·53. As in 1905 the disease was most prevalent and fatal during 1906 among troops in the Western Command, and as regards Divisions it was most prevalent among troops in the 9th (Secunderabad), the 5th (Mhow) and the 6th (Poona) Divisions. The death rates were highest among troops in the Mhow and Burma Divisions. As regards geographical groups the disease was most prevalent in the Deccan group (IX) and most fatal in the Burma Coast group (I). Excluding stations with a strength below 150 the highest admission rates were recorded at Aden (56·4 per mille), Barrackpore (53·5), Jubbulpore (48·5), Secunderabad (44·2) and Jhansi (42·1). For the European army as a whole the months of greatest prevalence were July, August and September, and those of least prevalence January and February.

Among the whole European army of India there were 960 admissions on account of diarrhœa, with no fatality, as compared with 1,070 admissions and 37 deaths on account of dysentery. The disease, like dysentery, was most prevalent among troops in the Western Command. As regards geographical groups the highest admission rates were recorded in groups XII*a* (Hill Stations) and VIII (Central India). In the first of these are included the two stations with the highest ratios, namely, Ranikhet (58·1 per mille) and Jutogh (39·0).

Hepatic abscess.—In all 183 admissions to hospital on account of abscess of the liver and 107 deaths were recorded during 1906 as compared with 153 admissions and 84 deaths during the previous year, the admission and death rates per mille being in 1906, 2·6 and 1·52, and in 1905, 2·1 and 1·18. The admission and death rates were highest among troops in the Western Command and as regards Divisions the admission rate was highest among troops in the 5th (Mhow) Division and the death rate among troops in the 6th (Poona) Division. One or more cases occurred in 60 stations and, excluding Calicut where the average strength was low, the highest admission rate was recorded as usual at Barrackpore, where there were five cases with three deaths. At Secunderbad, however, there were 17 cases and eight deaths, at Mhow 10 cases and four deaths, at Poona eight cases and nine deaths and at Sialkot eight cases and four deaths. The majority of the cases at Secunderabad were associated with dysentery, but in one case the disease followed an attack of enteric fever. In one of the fatal cases the abscess had opened into the lung, and in another into the stomach. There was a history of dysentery in four of the cases at Mhow, in eight at Poona and in one at Sialkot, but in the majority of the fatal cases even when no history of dysentery had been obtained chronic ulceration of the large intestine was found after death. Multiple abscesses were found *post-mortem* in nearly all the fatal cases.

Alcoholism.—There were 170 admissions to hospital and six deaths from alcoholism during 1906 as compared with 197 admissions and 11 deaths during the previous year, the corresponding average numbers recorded annually during the decennium ending 1905 being 242 and 8, respectively.

Venereal diseases.—The recorded admission rate for all venereal diseases in 1906 was 117·3 per mille of strength, the death rate was ·16 per mille and the constantly sick rate was 12·3 per mille. These figures are represented in actual numbers by 8,242 the total admissions, 11 the total deaths, and 864·79 the total number constantly sick throughout the year. The corresponding figures in 1905 were, as regards rates 153·7 per mille, ·18 per mille and 15·3 per mille and as regards actual numbers 10,966 the admissions, 13 the deaths, and 1,089·27 the number constantly sick. That the noteworthy reduction in the rates during recent years is due to a real reduction in the amount of venereal disease among European troops there can be little doubt, for in 1906 the procedure with regard to the statistical record of the diseases under this heading was the same as in 1905, and the reduction is evident in the statistics of invaliding and death which are not affected by changes in the method of record. The decrease is doubtless due to a number of causes among which the strenuous efforts put forth of late years by all classes of military and medical officers as well as by cantonment magistrates and by the authorities of the Royal Army Temperance Association to lessen the great annual wastage from this cause are not the least important. Some indication of the good results of these efforts may be obtained from the figures of the "syphilis register" upon which is entered the name of each man who comes under treatment for this disease for the first time. This register was started in 1904 and in that year the names of 2,947 men were entered upon it. In 1905 the names of only 1,470 men had to be entered on it and in 1906 the names of only 936, so that we may assume that the number of men who contract syphilis each year is steadily decreasing. Another potent factor in bringing about a

reduction in the amount of venereal disease is the great improvement which has taken place in the methods and duration of treatment. It is well known that the high admission rates from venereal disease in former years were due largely to the great number of readmissions to hospital which occurred on account of relapses. At present every man whose name is on the syphilis register has to attend hospital once a week for observation and treatment during a period of about two years; and this measure must lessen not only the number of relapses but also the chance that a serious complication will ensue, and for this reason must tend to reduce the number of invalidings and deaths. During 1906 only 583 men had to be readmitted to hospital while undergoing observation and treatment as compared with 902 in 1905. There has been a great improvement also in the method of carrying out the treatment of gonorrhœa and to this is probably due in great part the reduction in the admission and invaliding rates from this disease.

The average period of detention in hospital of a patient suffering from any form of venereal disease during 1906 was 38·30 days and the total loss of service involved amounted to 315,648 days, the non-efficiency thus reckoned being about four times as much as that incurred on account of enteric fever.

There were 11 deaths (·16 per mille of strength) attributed to venereal diseases during 1906 as compared with 13 (·18 per mille) in 1905 and 15 (·21 per mille) in 1904; and the number of men invalided for this cause was 131 (1·86 per mille) as compared with 83 (1·16 per mille) in 1905 and 199 (2·80 per mille) in 1904.

There was a decrease in the admission rates from venereal diseases in all three Commands, but in 1906 as in the previous year the rate in the Eastern Command was highest (126·9 per mille) and that in the Western next (120·6), the admission rate in the Northern Command being only 75·7 per mille as compared with a rate of 132·4 per mille among troops outside this command. Among Native troops also venereal diseases are less prevalent in the Northern Command than elsewhere. As regards Divisions venereal diseases were most prevalent in the 10th (Burma) Division with a rate of 191·1 per mille and the 9th (Secunderabad) with a rate of 153·9 per mille, and least prevalent in the Peshawar Division (64·5 per mille) and the Quetta Division (75·9). Excluding stations at which the average strength was less than 100 the highest admission rates on account of venereal diseases among European troops in the Northern Command were recorded at Kasauli (148·6 per mille), Attock (146·6) and Lahore Cantonment (137·2); in the Western Command at Deolali (252·7), Saugor (252·5) and Bombay (217·5); in the Eastern Command at Fort William (324·8), Fort Allahabad (228·9), and Barrackpore (214·0); in the Secunderabad Division at Mallapuram (284·6), Madras (235·6) and Bellary (205·9); and in the Burma Division at Rangoon (228·2), Shwebo (222·7) and Maymyo (204·6).

The admission rate on account of gonorrhœa was 61·0 per mille of strength in 1906 and that on account of soft chancre 28·5 per mille as compared with rates of 74·8 and 43·3 per mille respectively in 1905. Eleven men as compared with eight in the previous year were invalided for gonorrhœa during 1906.

Heat-stroke.—The total number of deaths recorded as a result of heat-stroke during 1906 was 39 as compared with 55 in 1905 and 35 in 1904. The stations at which the largest numbers of deaths from this cause occurred during 1906 were Nowshera (8), Aden (4), Lahore Cantonment (3) and Multan (3).

Suicide.—The average annual number of suicides reported in the decade 1891-1900 was 19 and in 1906 the number was 21, of which six were by gunshot, eight by cut-throat, two by drowning, two by hanging, one by oxalic acid poisoning, one by strychnine poisoning and one by multiple injuries.

Invaliding.—From the whole European army of India 1,993 men were invalided in 1906 (28·36 per mille of strength) as compared with 1,508 (21·24 per mille) in the previous year. The rates per mille of strength ranged from 41·99 in the Western Command to 19·47 in the Burma Division. The chief causes of loss by invaliding have been mentioned on page 29 and a striking feature of the statistics is the large increase in the number of men invalided for enteric fever and for debility. Of the 115 men (against 52 in 1905) invalided for enteric fever 110 were under 30 years of age and 90 had been less than four years in India, and of the 255 (against 152 in 1905) invalided for debility 178 were under 30 years of age and 116 had been less than four years in India. Of the total number of men invalided from all causes 48 per cent. were under 25 years of age and 83 per cent. under 30 years of age; and as regards length of residence in India 27 per cent. of all invalids had less than two years' service in this country and 66 per cent. less than five years.

Officers.—The average strength of commissioned officers with European troops in India during 1906 was 2,225 and among these there were 1,620 cases of sickness, 138 were invalided and 39 died during the year. The admission rate, the constantly sick rate, the invaliding rate and the death rate were each considerably higher than in the previous year, the death rate rising from 9·04 to 17·53 per mille. The admission rates on account of influenza, ague, cholera, small-pox, enteric fever, simple continued fever, and hepatic affections were all higher than in 1905, but those of pneumonia, dysentery, diarrhœa and venereal diseases were lower. There were 14 deaths from enteric fever, the chief cause of mortality, giving a ratio of 6·29 per mille against 2·58 per mille in 1905. There were 39 cases of dysentery with one death, six cases (all fatal) of cholera, and two cases (both fatal) of hepatic abscess. Two officers suffered from plague but both recovered. As compared with the incidence on troops the following diseases were more prevalent in proportion to strength: influenza, cholera, small-pox, enteric fever, simple continued fever, other respiratory diseases, dysentery, diarrhœa, congestion of the liver, while the officers suffered less than the men from malarial fevers, tubercle of the lungs, pneumonia, hepatic abscess, venereal diseases. Enteric fever, ague, debility, and dysentery were the chief causes of invaliding.

Women.—The health of the women was not so good during 1906 as during the previous year. The average strength was 3,431, which is an increase of 56 on that of 1905, and there were in all 2,600 admissions to hospital and 42 deaths giving admission and death rates of 757·8 and 12·24 per mille respectively as compared with rates of 646·8 and 10·96 in 1905. The constantly sick rate was 32·9 per mille as compared with 27·9. The chief causes of admission to hospital were, as usual, debility, diseases peculiar to women, and ague, which together accounted for 65·00 per cent. of the total number of admissions from all causes. Of the 42 deaths five were due to enteric fever, five to child-birth and abortion, four to hepatic abscess and three each to small-pox and pneumonia. The highest admission rate was recorded in the Secunderabad Division and the highest death rate in the Eastern Command.

Children.—There was a higher rate of sickness and a higher mortality among the children during 1906 than in either of the two previous years. The average strength was 5,322, the admission rate 469·0 per mille, the constantly sick rate 18·0 and the death rate 44·72. The chief causes of sickness were ague, diarrhœa, respiratory diseases, measles, and eye diseases which together accounted for 42 per cent. of the total number of admissions from all causes. There was an increase in the prevalence of measles, ague, dysentery, diarrhœa and diseases of the eye as compared with 1905. Out of the total of 238 deaths 42 were attributed to diarrhœa, 34 to debility and immaturity at birth, 20 to convulsions, 17 to teething, 16 to respiratory diseases, and 11 to dysentery. There were 30 admissions to hospital with three deaths from enterie fever and 240 admissions with 42 deaths from diarrhœa. Among the exanthemata to which children are liable there came under treatment during the year 144 cases of measles, 49 cases of chicken-pox, 10 of rubella, 7 of scarlet fever and 5 of small-pox; there were also 22 cases of whooping cough, 19 of mumps, 5 of diphtheria and 4 of dengue. Sickness was greatest among children in the Secunderabad Division and mortality among those in the Western Command.

Immaturity at birth was the cause of death in 29 per cent. of the total number of deaths among children under six months of age.

Native Troops.

(For Statistical Tables, *see* pages 122 to 125.)

Sickness and mortality in 1906.—The average strength of the Native troops, includ-

Native troops.	All causes, Ratios per mille.		
	1900-04.	1905.	1906.
Admissions	719·0	607·1	683·5
Constantly sick	27·2	23·2	23·0
Deaths	10·87	8·09	6·57
Invalids	11·92	9·02	7·05

ing those on duty in China, was 127,853 as compared with 123,434 in 1905, and their health, as judged by the statistics of sickness and mortality, was good, the constantly sick rate and the death rate being the lowest on record. The statement above enables a comparison to be made at a glance between the rates of sickness, mortality, and invaliding for the year under review, for the previous year and for the quinquennial period from 1900-1904, and it will be seen that a striking feature of the statistics is the reduction in the rates of mortality and invaliding. As compared with 1905 the reduction in mortality and in invaliding is represented in actual numbers by the fact that there were 158 fewer deaths and 211 fewer invalidings during 1906 than during 1905. The increase in the rate of admission to hospital was due almost entirely to the greater prevalence of ague, the admission rate from which was 261·8 per mille as compared with 171·2 per mille in 1905; simple continued fever, dysentery, cholera and scurvy were the only other diseases, the admission rates from which were higher than in the previous year. There was a considerable reduction in the mortality from pneumonia and other respiratory diseases and from "remittent fever", but a considerable increase in the mortality from cholera.

The chief causes of sickness during 1906 were intermittent fever, dysentery, simple continued fever, "other respiratory diseases," venereal diseases and anæmia and debility, in order of their relative prevalence, intermittent fever accounting for 38 per cent. and dysentery for nearly five and a half per cent. of the total number of admissions from all causes. In connection with the remarks upon simple continued fever which were made in the section relating to European troops it is important to note that among Native troops the admission rate from this cause was nearly double that of the previous year and nearly four times as high as in 1904, and this disease now occupies the third place among the chief causes of sickness. The principal causes of death were pneumonia, tubercle of the lungs and cholera, these diseases accounting respectively for 23·7 per cent., 8·0 per cent., and 7·4 per cent., of the total number of deaths from all causes. The number of men invalided for discharge from the service during 1906 was 902 as compared with 1,113 in 1905, the chief causes of this source of loss being tubercle of the lungs, debility, rheumatism, venereal diseases, and intermittent fever.

If Table XI be compared with Table II it will be seen that the Native troops suffered less than the European troops from influenza, cholera, small-pox, enteric fever, intermittent fever, simple continued fever, diarrhœa, hepatic affections and venereal diseases, but that they suffered more from each of the other chief causes of sickness and also from scurvy.

Commands and Divisions.—As regards the relative healthiness of Native troops in the three Commands it may be noted that those located in the Eastern Command were the most healthy during 1906. The rate of admission to hospital and the constantly sick rate were highest in the Northern Command, due chiefly to the greater prevalence of malarial fevers; but the death rate was highest in the Western Command, where cholera was prevalent. As regards the ten Divisions the 2nd (Rawal Pindi) Division ranked as the least healthy during the year, the 5th (Mhow) Division coming next in the list and the 6th (Poona) Division third.

Geographical groups.—For the year 1906 groups IV (Bengal-Orissa), X (Western Coast) and VII (North-West Frontier) must be considered to have been most unhealthy for Native troops, and as regards groups IV and VII this is in accordance with general experience. Intermittent fever and influenza were most prevalent in group VII (North

West Frontier), enteric fever in group IX (Deccan), pneumonia in group XII (Hill Stations), dysentery and tubercle of the lungs in group X (Western Coast). The highest death rates were recorded during 1906 in groups X (Western Coast), where the mortality was due chiefly to pneumonia, circulatory diseases and dysentery, and IV (Bengal-Orissa) where it was due chiefly to cholera and pneumonia.

In Table XIII will be found the statistics for each of the years from 1902 to 1906 of some of the chief diseases among Native troops located (1) in the plains, (2) in hill stations which are between 3,000 and 5,000 feet in height, and (3) in hill stations which are between 5,000 and 8,000 feet in height. The statement shows that in 1906, as in previous years, the hill stations below 5,000 feet in height were least favourable to the health of the troops. The great majority of these stations are situated on the north-western and western frontiers of the Empire.

Stations.—In 1906 there were 40 stations in which the average strength of Native troops was over 1,000, but in only three of these, namely, Dera Ismail Khan, Abbottabad, and Mhow were the admission and death rates very high. In Dera Ismail Khan the admission rate was 1,795·4 per mille, and the death rate 5·80 per mille, the chief causes of the large amount of sickness being malaria, dysentery and "other respiratory diseases." In Abbottabad the admission rate was 1,218·7 and the death rate 7·67 per mille, respectively; of the 4,291 admissions to hospital recorded at this station 2,519 were due to intermittent and simple continued fevers and of the 27 deaths 12 were due to tubercle of the lungs and 7 to pneumonia. The admission and death rates at Mhow were 810·2 and 16·67 per mille, respectively, the high death rate being due chiefly to the mortality from plague. Among the regiments with a record of much sickness and mortality during the year were the 6th Jat Light Infantry at Jhansi, the 69th Punjabis at Dera Ismail Khan, the 125th Rifles at Bangalore and the 2-5th Gurkha Rifles at Abbottabad. In all these regiments ague, simple continued fever, and dysentery were the chief causes of sickness.

Influenza.—Influenza was less prevalent during 1906 among Native troops than among European troops or native prisoners, but the rate of admission to hospital rose from 1·5 per mille in 1905 to 5·2 per mille in 1906. The largest numbers of cases recorded among Native troops in the different stations were 134 at Peshawar, 103 at Karachi, 60 at Cawnpore and 49 at Dehra Dun. The disease was most prevalent at Peshawar during June, July and August, at Karachi during November and December, at Cawnpore during August and September, and at Dehra Dun during January, February and March.

Cholera.—There was a considerable increase in the prevalence of cholera among Native troops, 94 cases and 62 deaths being reported during 1906 as compared with 11 cases and 7 deaths in 1905 and 27 cases and 22 deaths in 1904. The disease was widely prevalent among the general population of the country and the success which attended the measures to prevent the disease from spreading among the troops is indicated by the fact that although a case or cases occurred in 32 regiments, only one case occurred in 13 regiments, only 2 in six regiments, only 3 in three regiments, and only 4 in five regiments, so that there are left only five regiments in which 5 or more cases occurred. These were the 61st Pioneers at Secunderabad (15 cases), the 122nd Rajputs at Indore (8 cases), the 96th Berar Infantry at Secunderabad (7 cases), the 26th Light Cavalry at Poona (5 cases), and the 78th Rifles at Ahmednagar (5 cases). The outbreak in the 61st Pioneers lasted from the 16th to the 27th of July. The majority of the cases occurred among the married sepoys and 15 women and 14 children were also attacked. It was thought that the outbreak was due to the contamination of one of the wells and it ceased after the closure of this well. The outbreak in the 122nd Infantry at Indore was attributed to the patients having drunk contaminated water on the march from Mhow at a village where several cases of cholera had occurred. The cases in the 78th Moplah Rifles at Ahmednagar were attributed to contaminated milk obtained from a native dairy adjacent to the lines. All the cases in the 26th Cavalry at Poona were imported.

Small-pox.—There were 79 admissions to hospital and 4 deaths from small-pox during the year as compared with 77 admissions and 1 death in 1905. The rates per mille of strength in 1906 were ·6 and ·03, respectively, the former being higher, but the latter equal to the corresponding rates for the decennial period 1891-1900. The troops in the Western Command were chiefly affected, 48 of the cases being recorded in this Command. A case or cases occurred in no fewer than 45 regiments, but there was only 1 case in 27 and there were only 2 in nine and only 3 in six, the highest numbers which occurred in any regiment being 7 (in the 87th Punjabis), the next 5 (in the 12th Pioneers),

and the next 4 (in the 94th Infantry). Some remarks upon the relative prevalence of the disease among European and Native troops have already been made in the section on European troops.

Ague, remittent fever, simple continued fever.—Intermittent fever accounted for over 38 per cent. of the total number of admissions from all causes in 1906 and the admission-rate, which had been steadily falling since 1902, rose from 171 per mille in 1905 to 262 per mille. The admission rates recorded in all but two of the twelve geographical groups were higher than in 1905, the two exceptions being Burma Coast (I) and Bengal-Orissa (IV); and as regards the Commands the admission rates in all were considerably higher than in the previous year, the increase being greatest in the rate recorded in the Northern Command. The months of greatest prevalence of the disease were, as usual, October and November and fewest admissions were recorded during February and March. Among the stations at which the average strength was over 150, those from which the highest admission rates were returned were Dera Ismail Khan (1,196 per mille), Deesa (918 per mille), Delhi (830 per mille), Dthala (796 per mille), Jacobabad (753 per mille), Jhansi (711 per mille) and Baroda (638 per mille). In eight other stations the admission rate was over 500 per mille of strength. The admission rate recorded among the Native troops in Mauritius was 715 per mille and among those in Port Blair (Andaman Islands) it was 544 per mille. Dera Ismail Khan was garrisoned during the year by the 29th Mountain Battery, the 16th Cavalry, the 20th Infantry and the 26th and 69th Punjabis, the average annual strength of the Native troops being 2,415. The admission rate among the men of the 29th Mountain Battery was 2,048 per mille, among those of the 16th Cavalry it was 1,606 per mille, among those of the 69th Punjabis it was 1,001 per mille and among those of the 26th Punjabis it was 915 per mille. These very high rates were due in part to the fact that many patients had to be re-admitted to hospital four or five times on account of relapses and from the reports of the medical officers it would seem that the treatment of patients with quinine was not in all cases sufficiently thorough or sufficiently prolonged. Mosquito brigades were organized for each regiment and during the malarial season (which lasted from October to December) the houses occupied by the troops were twice fumigated with sulphur with the object of destroying mosquitoes. Quinine was issued as a prophylactic in all regiments, but the means taken to ensure that the measure was efficiently carried out are not stated in the reports. The 108th Pioneers and a detachment of the 119th Infantry were at Deesa throughout the year, the admission rate from ague in the former regiment being 923 per mille and in the latter 1,020 per mille. The disease was most prevalent during October, November and December. The medical officer of the 108th Pioneers attributed the epidemic to the steady and heavy rainfall of the year and to the fact that the lines are built on the banks of a broad river which overflows, leaving many stagnant pools in which mosquitoes breed. Quinine was administered as a prophylactic twice a week during September and three times a week from the beginning of October to the end of the year, but the dose was only 5 grains. The 35th Sikhs and the 18th Lancers were at Delhi during the greater part of the year; the admission rate from ague in the former regiment being 1,174 per mille and in the latter 300 per mille. Quinine was used as a prophylactic (a dose of 10 grains being given twice a week) during August, September and October, and anti-mosquito operations were carried out, but the medical officer of the 35th Sikhs reports that on account of the proximity of the river, and the numerous "tanks" and other breeding places in and around the lines such operations would have to be on an immense scale to produce an appreciable effect. Dthala is in the Aden Hinterland and the 81st Pioneers were stationed there throughout the year. The admission rate from ague in this regiment was 1,089 per mille. August, September and October were the malarious months, but there were also a large number of admissions (due to relapses) in November. Anopheles mosquitoes were found in great numbers. The two regiments stationed in Mauritius suffered less from malaria than in 1905, the admission rate from this cause in the 11th Rajputs falling from 2,205 per mille to 742 per mille and in the 75th Carnatic Infantry from 1,113 to 636. All the men were provided with mosquito nets and quinine was issued prophylactically. One sepoy in the 11th Rajputs suffered from blackwater fever. Quartan parasites were found in his blood at the beginning of the attack. At first he was treated with quinine, but as it appeared to be doing harm it was discontinued on the 12th day of the disease. The patient ultimately recovered. For further remarks on malaria in various stations the reader is referred to pages 31 to 35.

The number of admissions to hospital recorded as due to remittent fever in 1906 was 633 and the number of deaths was 43, the rates per mille of strength being 5 and

·34, respectively, as compared with 8·4 and ·56 in 1905. This recorded decrease during a year when malarial fevers were much more prevalent and severe than usual is in accordance with the inconsistency which always characterizes the statistics of remittent fever; it may be due to the fact that many medical officers now return under this heading only those cases in which there is some doubt as to the correct diagnosis. The disease from which one or more patients were suffering was returned as remittent fever in 86 stations during the year, but in 29 of these only 1 case was recorded and in 70 the total number did not exceed 10. The stations at which most cases were recorded were Nowshera (77), Maymyo (45), Kirkee (28) and Jhelum (25), and as in these stations the seasonal incidence agreed with that of intermittent fever it is probable that the medical officers returned as remittent fever all cases of malarial fever in which the temperature chart did not show regular intermissions. This is the reason given by the medical officer of the 45th Sikhs for the large number of cases at Nowshera and the practice is in accordance with the system adopted in the 3rd edition (1896) of the Nomenclature of Diseases. Further remarks upon remittent fever will be found in the sections on European troops and Prisoners.

The following statement shows that among Native as well as among European

SIMPLE CONTINUED FEVER, NATIVE TROOPS.

Years.	Total admissions.	Admission rate per 1,000.
1902	631	5·1
1903	441	3·5
1904	829	6·7
1905	1,768	14·3
1906	3,783	29·6

troops the number of cases recorded as due to simple continued fever has increased greatly during recent years and it may be assumed that the cause of the increase is similar as regards both classes of soldiers. The matter has been discussed in some detail in the preceding Section and further remarks are unnecessary here, save to say that as the practice of returning as malarial fever only those cases in which malaria parasites are found by microscopic examination of the blood is not so generally adopted by medical officers of Native as of European troops, the increase in the recorded prevalence of simple continued fever is not so great among the former as among the latter. In 1906 most cases were recorded among Native troops in the month of September and fewest in January and February, and the regiments from which the largest numbers of cases were returned were the 2-6th Gurkha Rifles (400 cases), the 1-6th Gurkha Rifles (261 cases), the 2-5th Gurkha Rifles (274 cases), all at Abbottabad and the 36th Sikhs (214 cases) at Rawalpindi. Thus 1,149 out of the total number of 3,783 admissions were recorded in two stations only and this fact may afford some reason for the conjecture that when more accurate methods for the diagnosis of malarial fevers among natives of India become generally applied it will be found that the number of cases of disease classified as "pyrexia of uncertain origin" will be greatly increased, while the number of cases recorded as true malarial fever will diminish proportionately.

Kala-azar.—There were 10 cases diagnosed as kala-azar during the year. They occurred in the following regiments and stations:—1 in the 1-6th Gurkha Rifles at Abbottabad, 3 in the 1-2nd Gurkha Rifles, 3 in the 2-2nd Gurkha Rifles, 2 in the 1-9th Gurkha Rifles, and 1 in the 2-9th Gurkha Rifles, all at Dehra Dun. Six of the patients died. An examination of the medical case sheets shows that the signs and symptoms were in all instances typical of the disease and in the majority the diagnosis was further confirmed by the discovery of the Leishman-Donovan parasites in the splenic blood. It is remarkable that cases should have been recorded only in these two stations and only in Gurkha sepoys, but it is probable that when medical officers become more familiar with the signs and symptoms of the disease the number of cases recorded among Native troops will increase considerably.

Enteric fever.—Among the whole Native army of India 127 cases of enteric fever with 34 deaths were recorded during 1906 as compared with 130 cases with 35 deaths during 1905, 70 cases with 16 deaths during 1904 and 86 cases with 27 deaths during 1903. The admission rate was 1·0 per mille in 1906 and the death rate ·27 per mille as compared with rates of 1·1 per mille and ·28 per mille in 1905. Thus the record shows,

as usual, how slight is the prevalence of the disease among Native troops and this is apparent also from the facts that cases occurred in no fewer than 69 regiments and 40 stations and that in 41 regiments only 1 case occurred and in 12 only 2. The regiments in which most cases occurred were the 76th Punjabis at Secunderabad (9 cases), the 96th Berar Infantry at Secunderabad (8), the 87th Punjabis at Jhansi (7), and the 2-6th Gurkha Rifles at Abbottabad (7). Of the total number of cases 25 occurred among Gurkhas which gives a ratio of 1·8 per mille as compared with a ratio of ·9 per mille for the incidence among sepoys of other classes.

In a number of instances the clinical signs and symptoms were typical of the disease and intestinal hæmorrhage and perforation occurred in several, but in many cases the type was mild and the diagnosis was arrived at only on the results of the agglutination test. This test was performed with the blood of 109 cases, a positive result in a dilution of 1 in 40 or 1 in 80 being obtained in 80 cases, or 73 per cent. The blood of one patient gave a positive re-action with the paratyphoid bacillus, but a negative with the typhoid bacillus; and in one case the typhoid bacillus was isolated from the peripheral blood. A *post-mortem* examination was carried out in one case only, and in this case although the clinical symptoms and signs were typical the agglutination re-action both with the typhoid bacillus and with the strain of the paratyphoid bacillus at the Pasteur Institute, Kasauli, was persistently negative. The lower part of the ileum was found to be intensely congested, but no ulcers corresponding to Peyers' patches were present. The reports of medical officers as well as the statistics bring out the fact that nothing in the nature of an epidemic occurred among Native troops during the year and even in the regiments in which from 6 to 9 cases were recorded the admissions to hospital occurred at wide intervals, as for example, in the 87th Punjabis, in which the admissions were recorded in June, July, November and December, the 2-6th Gurkha Rifles (January, June, July, November, December), the 96th Berar Infantry (August to November), and the 15th Sikhs (April, May, September and October). As in the majority of instances only 1 case occurred in a regiment during the year it is not surprising that the source of infection was not definitely traced in any case. The drinking of unboiled milk obtained in bazaars was mentioned as the most probable cause of infection by the medical officers of several regiments and contaminated canal or well water was suspected in other instances, but beyond these remarks little or no information with regard to etiology is to be obtained from the reports.

Malta fever.—A considerable number of admissions to hospital on account of Malta fever were again recorded during 1906, namely, 38 with 1 death. In 1905 the number was 43, in 1904 five, in 1903 eight and in 1902 four. The disease shows no special seasonal incidence and in 1906, February was the only month in which no admission occurred. At Ferozepore there were 22 admissions to hospital, 14 from the 14th Sikhs and 8 from the 15th Sikhs; at Jhansi 4 admissions, all from the 12th Pioneers; at Lahore Cantonment (Mian Mir) 4 admissions, 3 from the 34th Sikhs and 1 from the 38th Dogras; at Jullundur 3 from the 29th Punjabis; at Ambala 1 from the 32nd Sikhs; at Delhi 1 from the 33th Sikhs; at Edwardesabad 1, from the 31st Punjabis; at Meerut 1 from the 31st Lancers; and at Agra 1 from the 17th Infantry. Thus five of the nine stations from which cases were reported are in the Punjab, two are in the United Provinces, one is in Central India and one is on the North-West Frontier, and it is noteworthy also that at least 32 of the patients were Sikhs. A full account of the disease among the men of the 15th Sikhs has been published by Major Wimberley, I.M.S., and the clinical signs and symptoms in a number of the cases in this regiment as well as in the 14th Sikhs were typical; 100 days or more was a common duration of the fever, relapses were frequent, pain and effusion in the joints was present in most cases and the blood agglutinated the *Micrococcus melitensis* in dilutions as high as 1 in 1,280 and in one case as high as 1 in 5,120. No case occurred in the 15th Sikhs after August 1906, and Major Wimberley reports that this may have been due to the fact that all the goats from which milk was obtained were inspected and those which appeared in poor condition got rid of. He was formerly of opinion that the disease is widely prevalent throughout northern India, but he now considers that in any given locality only a few of the goats are infected and if this should prove to be the case it should not be difficult to stamp out the disease. In a number of cases in other regiments the clinical signs of the disease were by no means typical and the diagnosis was arrived at by excluding malarial fever, enteric fever, rheumatic fever and other diseases and especially by the results of the agglutination test. Common diagnoses on first admission to hospital were "ague," "simple continued fever," "remittent fever," "enteric fever" and "rheu-

matism," and it was only by a process of exclusion and by the results of the agglutination test that a correct diagnosis was at length made. Sciatica and neuralgic pains in the muscles and joints appear to be the symptoms most frequently complained of and in any case of this nature associated with fever the serum test should be carried out. In the great majority of cases of Malta fever the agglutination phenomenon occurs in high dilutions of the serum, so that the diagnosis is not in doubt, but in a few the test may fail. Major Wimberley reports such a case in the 15th Sikhs. The patient was admitted to hospital on the 18th December 1905 and on the 1st of January 1906 his blood serum gave a complete re-action with the *Micrococcus melitensis* in a dilution of 1 in 640. The attack lasted seven weeks and the test was carried out repeatedly until the 2nd of March, but after the 21st of January no re-action even in a dilution of 1 in 10 could be obtained. Bassett-Smith also reports that in prolonged cases the agglutination re-action may be obtained only in very low dilutions and a fatal case is recorded in which for some months before death, 1 in 10 was the highest dilution in which a complete re-action was obtained, although on the day before the patient died the *Micrococcus melitensis* was isolated from the blood.

Plague, Cerebro-spinal fever.—Despite the continued prevalence of plague among the civil population of India the disease has hitherto been prevented from appearing in epidemic form among the Native troops. In 1906 there were 147 admissions to hospital and 83 deaths from this cause as compared with 79 admissions and 46 deaths in 1905, 187 admissions and 111 deaths in 1904 and 184 admissions and 115 deaths in 1903. Out of the total of 160 stations occupied by Native troops during 1906, about 104 were situated in districts where plague was prevalent among the general population yet in only 27 of these did cases occur among the troops. The largest number of admissions at any station was 30 at Poona, 10 of the cases occurring in the 33rd Light Cavalry, 7 in the 121st Pioneers, 5 in the 94th Infantry, 4 in the 78th Moplah Rifles and 2 each in His Excellency the Governor's Body Guard and the 114th Mahrattas. Other stations where the disease was prevalent among Native troops were Neemuch in which 22 cases occurred in the 3rd Skinner's Horse; Mhow in which 18 cases were distributed among men in the 102nd Grenadiers, 122nd Infantry and 101st Grenadiers; Kirkee in which 13 cases were distributed among men in the 107th Pioneers, the 3rd Sappers and Miners and the 110th Mahratta Light Infantry; and Kamptee where 11 cases occurred in the 80th Carnatic Infantry. In no other stations were more than 7 cases reported and in 10 stations and 14 regiments only 1 case occurred. The measures generally adopted during the year were similar to those described in this report for 1904. During 1906 only 3 cases of cerebro-spinal fever with two deaths were recorded among the Native army of India. All occurred in the 21st Punjabis at Jhelum. The disease was apparently contracted by the three patients at the same time, but the source of infection was not traced.

Scurvy.—The total number of admissions to hospital on account of scurvy during 1906 was 397, which gives a ratio of 2·4 per mille as compared with a ratio of 1·7 per mille in 1905. About 50 per cent. of the admissions in 1906 were recorded among troops in the Western Command and about 18 per cent. among troops in the Eastern; and as regards geographical groups over 29 per cent. of the admissions occurred among troops in group XII (Hill Stations), over 12 per cent. among troops in group IX (Deccan) and over 10 per cent. among troops in group VIII (Central India). The largest numbers of cases occurred in the 128th Pioneers (42 admissions to hospital and 1 death), the 106th Pioneers (37 admissions), the 2-10th Gurkha Rifles (13 admissions), the 116th Mahrattas (11 admissions and 1 death) and the 120th Infantry (10 admissions). As regards the disease in the 128th Pioneers most of the cases occurred in the detachment at Robat, where great difficulty is experienced in obtaining fresh vegetables. The 106th Pioneers were at Sibi for the first three months of the year and for the remainder at Quetta. The medical officer states that arrangements have been made for the provision of vegetables in the dietary. Stomatitis was prevalent in the regiment, due partly, in the medical officer's opinion, to the fact that the men were careless about the cleanliness of their teeth. In the 2-10th Gurkha Rifles many men besides those admitted to hospital were found to be suffering from soft ulcerated gums and measures were taken to improve the meat and vegetable dietary with good results. The 116th Mahrattas were stationed in Aden, where scurvy is usually prevalent.

Tubercle of the lungs.—Since 1903 there has been a steady fall each year in the admission rate on account of tubercle of the lungs among Native troops and in 1906 this rate was 2·5 per mille (which is the lowest since 1896) as compared with 3·1 per mille in

1905. Among Gurkhas the admission rate fell from 6·1 per mille in 1905 to 5·2 per mille in 1906. There was, however, a slight rise in the death rate, from ·50 to ·52 per mille, and among Gurkhas a considerable rise, from 1·58 to 2·41. The highest admission rate for the year (9·0 per mille) was recorded in the Western Coast group (X), but the average strength in this geographical group is low; the next highest (3·6 per mille) was in the hill stations, group (XII) and the third (3·2) in the Upper Sub-Himalaya group (VI). The position of the second and third of these groups is due to the number of Gurkhas located in them for among regiments of this class the disease was, as usual, much more prevalent than among those of other classes, the admission and death rates for the Native army excluding Gurkhas being 2·3 per mille and ·33 per mille, respectively, and for Gurkhas 5·2 per mille and 2·41 per mille. The average strength of Native troops of other classes than Gurkhas located during 1906 in the Gurkha stations was 2,203 and the admission and death rates from tubercle of the lungs among these men were respectively 3·6 and ·25 per mille. Although the reason may be hard to find there can be no doubt that some classes of natives in India suffer more from tubercle of the lungs than others and the following table which gives the statistics of admissions to hospital from this disease among different races in the Native army located in India during the quinquennial period 1902 to 1906 is of interest in this connection. It is to be noted, of course, that in such a table it is not possible to take into account the important fact that the troops of the different classes shown in the table are located in different parts of India.

1902-1906.	Gurkhas.	Dogras.	Jats.	Mohamedans (Punjabi, Hindustani and Pathan).	Garhwalis.	Sikhs.	Rajputs.	Brahmans.	Madrasis.
Aggregate strength.	63,680	10,301	9,666	28,570	7,544	29,917	25,982	7,524	37,893
Total number of admissions.	818	60	45	79	29	99	62	16	65
Admission rates per 1,000.	12·8	5·8	4·7	3·9	3·8	3·3	2·4	2·1	1·7

The largest number of admissions (18) in any regiment during 1906 occurred in the 41st Dogras who were stationed at Shan Hai Kwan and Tongshan in north China, the prevalence of the disease being attributed by the medical officer to the severity of the winter and to the unsatisfactory housing arrangements for the troops. It appears that the barracks are old Chinese houses or temples, some at least of which are in a bad state of repair, that the lighting and ventilation are not satisfactory and that over-crowding exists to some extent among the sepoys and to a large extent among the followers. The 47th Sikhs were also in north China (at Tientsin), but the barracks there are apparently satisfactory and only seven cases of tubercle occurred during the year. Among regiments located in India the largest numbers of admissions were recorded in the 30th Punjabis at Jhelum (13), and in the 2-5th, 7th and 2-10th Gurkha Rifles at Abbottabad and Lansdowne (8 each). As regards the prevalence of the disease in the 30th Punjabis it is said that nearly all the cases originated in north China, where the regiment was stationed during 1904 and the early part of 1905 and the medical officer considers that the barracks which the men occupied during this tour of duty were previously infected. No remarks worthy of note are made by the medical officers of the different Gurkha regiments in which the disease was prevalent.

There were 2 cases returned as non-tuberculous phthisis during the year as compared with 6 in 1905, 3 in 1904, 6 in 1903, and 23 in 1902.

Pneumonia and other respiratory diseases.—The admission rate on account of pneumonia was 9·0 per mille and the death rate 1·56 per mille as compared with rates of 12·5 and 1·90 per mille, respectively, in 1905. The disease was considerably less prevalent than in the previous year in six of the geographical groups, the decrease being greatest in the North-West Frontier group (VII), where the admission rate fell from 20·5 in 1905 to 10·0 in 1906, in the Western Coast group (X) where it fell from 13·7 to 5·6, in the Bengal-Orissa group (IV) where it fell from 10·9 to 5·5, and in the Upper Sub-Himalaya group (VI), where it fell from 15·4 to 10·3. The months of greatest prevalence were as usual January, February, March, November and December. From Table XIII it will be seen that while pneumonia is always more prevalent and causes more mortality among troops located in the hill stations considered as a whole than among those located in the plains, this is due in chief measure to its prevalence and fatality in the hill stations which are less than 5,000 feet above sea-level. Among stations where the average strength was

over 100 the highest admission rates were recorded at Sibi (53·6 per mille) and at Kherwara (40·2 per mille), and as regards regiments the highest rates were recorded in the 106th Pioneers at Quetta, the 1-6th Gurkha Rifles at Abbottabad, the 7th Rajputs at Malakand, the 2-5th Gurkha Rifles at Abbottabad and the 2nd Queen's Own Sappers and Miners at Bangalore.

Other respiratory diseases were most prevalent during the year in the Northern Command and in groups IV (Bengal-Orissa), XII (Hill Stations) and I (Burma Coast). For the whole Native army of India the admission and death rates on account of other respiratory diseases were 22·9 and ·13 per mille, respectively, as compared with 28·5 and ·23 per mille in 1905. Omitting stations where the average strength was less than 100 the highest admission rates were recorded at Ahmedabad (145·1 per mille), Aden (113·6), Abbottabad (85·5), Kohima (82·4), Sibi (76·6) and Thal (72·7). Among regiments the highest numbers of admissions during the year occurred in the 1-6th Gurkhas at Abbottabad, the 109th Infantry at Santa Cruz, the 116th Mahrattas at Aden, the 53rd Sikhs at Peshawar and the 55th Rifles at Nowshera. There were in all 16 deaths ascribed to these diseases, of which 8 were due to bronchitis, 3 to pleurisy, and 1 each to laryngitis, asthma, haemoptysis, broncho-pneumonia and empyema.

Dysentery and Diarrhœa.—Dysentery was rather more prevalent and fatal among Native troops during 1906 than during 1905, the rate of admission to hospital rising from 32·5 per mille to 37·1 per mille and the death rate from ·18 to ·20 per mille. The increase in the admission rate was due to a greater prevalence of the disease in eight of the geographical groups, but especially on account of its prevalence in the Western Coast group (X), where the admission rate was 101·0 per mille as compared with 20·7 per mille in 1905. The stations at which the disease caused the highest admission rates during the year were Bombay, Fort Jamrud and Sibi, and the highest death rates were recorded in Madras, Sibi and Bombay. Among regiments dysentery was most prevalent in the 6th Jat Light Infantry at Jhansi, the 128th Pioneers at Quetta, the 125th Rifles at Bangalore and the 113th Infantry at Bombay. The medical officer of the 6th Jat Infantry considered that the difficulty of obtaining good milk at a reasonable price was an important factor in bringing about the increased prevalence of the disease. The great majority of the cases in the 128th Pioneers occurred among men of the detachment at Robat where, it was said, the water is brackish.

There were in all 926 admissions to hospital and 10 deaths from diarrhœa during 1906 as compared with 929 admissions and 7 deaths during 1905. The case-mortality was, as usual, considerably higher than that of dysentery, and it is probable that in some cases the diagnosis is at fault. The regiments in which the largest numbers of cases occurred were the 2nd Rajputs in which there were 80 admissions to hospital recorded under this heading, the 113th Infantry in which there were 56, the 3rd Brahmans in which there were 31 and the 9th Bhopal Infantry in which there were 30. The 2nd Rajputs were stationed at Secunderabad during the year, and diarrhœa was most prevalent during July and August. The medical officer attributes the disease to the bad quality of the milk; he states that the milkmen are extremely dirty and that their cows grazed more often than not over the filth trenches, where the grass grows rankest. As regards the 113th Infantry the majority of cases of dysentery and diarrhœa occurred in the detachment at Santa Cruz, where it was probable the *atta* was not of good quality. Errors in diet and faulty cooking of food are referred to by the medical officers of other regiments as the probable cause of the prevalence of diarrhœa.

Venereal diseases.—As judged by the statistics of the year, venereal diseases were over seven times more prevalent among the European than among the Native troops, the admission rate per mille of strength being only 16·2 among the latter, as compared with an admission rate of 117·3 among the former. Among European troops an annual average strength of 70,272 gave 8,242 admissions from venereal diseases, in the case of Native troops an annual average strength of 127,853 gave only 2,067 admissions. The rates of admission to hospital and of invaliding from these diseases among the Native troops of the whole Indian Command have decreased steadily during recent years though not nearly to the same extent as in the case of the rates among European troops. The number of deaths from this cause among Native troops varies little from year to year; in 1906 there were 8 deaths and 55 invalidings as compared with 7 deaths and 79 invalidings in 1905, 6 deaths and 107 invalidings in 1904 and 9 deaths and 107 invalidings in 1903. The diseases are always less prevalent among both European and Native troops located in the Northern than among those in other

Commands, but in 1906 the admission rate among the Native troops in the Northern Command was 7 per mille less than in 1905 and among those in the Western Command it was 1 per mille less while among those in the Eastern Command it was 3 per mille greater than in that year. Gurkhas invariably suffer more than other classes of native troops and during 1906 this liability was evidenced by the fact that the admission rate among Gurkhas was 30·6 per mille while among the remainder of the troops it was 14·5 per mille. Excluding stations at which the average strength was less than 100 the highest admission rates on account of venereal diseases among Native troops in the Northern Command were recorded at Bakloh, Rawalpindi, and Ambala; the highest among troops in the Western Command at Satara, Bhuj, and Ahmednagar; the highest among troops in the Eastern Command at Almora, Kohima, and Shillong; the highest in the Secunderabad Division at Bellary and Madras; and the highest in the Burma Division at Maymyo and Fort Dufferin. Seven of these stations appeared in the corresponding list for 1905. Among all the Native troops in India the admission rate for syphilis was 5·3 per mille, for soft chancre it was 4·6 per mille, and for gonorrhœa it was 6·2 per mille as compared, respectively, with the figures 7·7 per mille, 4·6 per mille and 7·4 per mille in 1905.

Beri Beri.—There were in all 41 admissions to hospital and three deaths from beri-beri during 1906, but 38 of the cases occurred in one regiment (the 81st Pioneers) stationed in the Aden Hinterland. Two of the remaining cases occurred in the 99th Deccan Infantry at Bolarum and one in the 63rd Palamcottah Light Infantry at Fort William. The cases which occurred in the Aden Hinterland were said to be of the dry variety, but the report of the medical officer does not contain anything which throws light on the etiology of the disease. The patients were isolated, the site of the camp was changed, and a diet containing a larger amount of proteid was issued to the troops.

Guinea worm.—In 1906 there was again a decrease in the number of patients admitted to hospital for guinea worm, the total being 500 against 609 in 1905 and 730 in 1904. As usual the largest number of cases occurred in group VIII (Central India), groups IX (Deccan) and VII (Indus Valley) coming next in order of prevalence of the disease. As regards stations the largest number of cases were recorded as usual at Kherwara where the Mewar Bhil Corps is stationed, the number of cases in this regiment during the year amounting to 52 or a ratio of 84 per mille of strength. The average length of stay in hospital of patients was 32 days. The medical officer of the regiment states that 43 per cent. of the sepoys recruited in the Kherwara district suffer from guinea worm.

Suicide.—During the ten years 1896–1905 there were altogether 146 cases of suicide, an average of nearly 15 per annum. There were only 7 in 1906, of which three were by drowning, one by gunshot, one by hanging, one by opium poisoning and one by decapitation by a train.

Jails of India.

(For Statistical Tables, *see* pages 126 to 128.)

Sanitary Conditions in 1906.—The health of prisoners depends upon the hygienic state of the prisons, *i.e.*, the sites, buildings, water-supplies, etc., the efficiency of the management, and the quality of the health of newly admitted prisoners. Efficient management can make up for many deficiencies—skill and experience can turn imperfect buildings to the best account, remedy defects in water-supplies, and the like; and attention to suitable precautions will lessen the danger of the introduction of disease from without. The quality of the health of newly admitted prisoners depends ultimately on climatic conditions which must always influence the prison statistics, but the better the hygienic state of the prisons and the more efficient the management the smaller the effect of this influence will be.

The statistics of the years 1904, 1905 and 1906 show how small was the influence of climatic conditions on the health of the prisoners in these years, and furnish materials by which the growing efficiency of jail management in India may be judged. The year 1904 was, excepting for the prevalence of plague which does not affect the prison statistics, generally healthy, and the proportion of prisoners requiring treatment in hospital, the proportion constantly in hospital and the death rate (17·61 per 1,000) were lower than they had ever been. The following year, although marked by a great decline in the prevalence of plague, was not, except in Bombay and the Punjab, a healthy one, but the proportion of prisoners treated in hospital was even lower than in 1904, the proportion constantly sick was the same and the death rate rose by only 1·62 per 1,000. The year 1906 was very unhealthy; in every province except Bengal and Eastern Bengal and Assam the general health was bad, and the death rates, leaving plague out of account, were considerably higher than in 1905. Cholera was severe throughout southern India, and all over northern India the autumn was exceptionally malarious. In spite of these adverse conditions, the health of the prisoners was good, and although there was a considerable increase of sickness the duration of illness was generally short, and the death rate was only 19·25 per 1,000, or 1·66 higher than the lowest rate ever recorded.

The mean daily prison population in 1906 in India, including the Andamans was 110,082, or 3,817 more than in the previous year, every administration except the Central Provinces and the North-West Frontier Province contributing to the increase.

In the Andamans the number of convicts was increased by 340 to 14,688. The statistics relating to these convicts will be considered separately, because the conditions in which they live have little in common with prison life in India; but it is satisfactory to note that, although the rate of admission to hospital and the proportion constantly sick have risen, the death rate has fallen from 38·96 per thousand in 1905, and a mean of 37·38 in the five years ending with 1905, to 27·30, the lowest death rate since 1898.

The average daily number of prisoners of all classes in the jails of India and Burma during the year was 95,394, an increase of 3,477 on the average of 1905, but 85 less than the five years' mean. The rate of admission to hospital was 658 per thousand, compared with 647 in the previous year; in Eastern Bengal and Assam, the Central Provinces, Madras and Burma the admission rates were lower than in 1905, but throughout northern India and in Bombay they rose considerably. The mean constantly sick rate was 27 per thousand compared with 28 in 1905; in the United Provinces and in the Punjab the constantly sick rates were the same in 1906 as in the previous year, and only in Bombay and the North-West Frontier Province were these rates higher in 1906 than in 1905.

The death rates were lower than in 1905 in all provinces except Madras, Bombay and the North-West Frontier Province; unfortunately the rise in these provinces—5·90 per thousand in the case of Madras, 3·24 in Bombay, and 5·59 in the North-West Frontier Province, more than counterbalances the fall in the others, and the mean death rate

of 1906 was very slightly higher than the mean of the previous year—19·27 per thousand against 19·23.

The average daily number of convicted prisoners in confinement was 89,521, among whom the mean death rate was 18·95 per thousand against 19·23 in 1905, the rates ranging in the several administrations from 28·37 in Eastern Bengal and Assam to 13·06 in the Central Provinces. In five administrations the rates were under 20 per thousand, and in only one was the rate over 25.

The following statement shows the admission and death rates of convicts in central and district jails in the different provinces in each of the last five years.

Administration.		1902.			1903.			1904.			1905.			1906.		
		Average strength.	Ratio per 1,000 of strength.		Average strength.	Ratio per 1,000 of strength.		Average strength.	Ratio per 1,000 of strength.		Average strength.	Ratio per 1,000 of strength.		Average strength.	Ratio per 1,000 of strength.	
			Ad.	D.		Ad.	D.		Ad.	D.		Ad.	D.		Ad.	D.
					Bengal as a whole											
Bengal excluding in 1905 and 1906 the jails transferred to Eastern Bengal	Central	10,368	1,054·1	22·57	9,316	1,015·8	17·50	9,519	803·7	18·91	7,631	1,041·0	25·55	7,658	1152·4	23·64
	District	9,268	1,084·6	29·56	8,160	1,162·7	30·76	8,483	1,154·1	21·81	5,885	931·5	23·96	6,305	943·5	23·31
					Assam											
Assam including in 1905 and 1906 the jails of the new Province of E. B. & Assam.	Central	...	...	...	...	...	...	...	...	...	1,886	608·2	24·92	1,901	630·2	23·67
	District	1,362	890·5	30·10	1,296	809·3	29·32	1,430	650·6	28·68	4,392	1,248·4	35·06	4,832	997·1	30·22
United Provinces.	Central	11,475	653·5	23·4	9,387	642·8	12·9	9,313	502·7	12·78	9,389	489·8	15·76	9,934	482·4	14·90
	District	14,563	793·5	18·40	11,958	947·9	17·39	12,777	687·6	15·34	12,292	620·0	18·22	12,969	679·8	16·96
Punjab	Central	5,749	124·5	26·44	4,858	85·0	18·94	4,822	915·2	25·09	4,570	71·8	17·94	4,751	625·8	15·37
	District	6,179	1,100·3	25·25	6,341	1,056·3	19·71	5,930	961·2	15·85	5,961	740·3	16·10	6,017	868·2	17·28
North-West Frontier Province.	Central	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	District	893	110·3	28·00	972	121·3	16·48	1,035	118·2	16·21	1,077	1,053·9	21·36	1,091	1631·5	24·75
Central Provinces.	Central	3,465	957·3	23·09	2,676	772·1	16·82	2,468	489·9	10·13	2,418	574·0	14·06	2,272	520·2	12·32
	District	1,418	926·0	25·39	1,113	1,002·3	22·45	1,085	847·9	18·43	864	862·3	16·20	784	866·1	15·31
Madras	Central	7,042	499·1	18·32	5,775	447·6	18·35	6,129	439·9	15·01	6,695	506·6	15·98	7,464	462·8	22·37
	District	3,660	351·9	17·76	3,124	578·7	20·49	3,143	591·8	18·45	3,436	554·1	16·01	2,940	460·2	19·05
Bombay	Central	3,846	707·0	33·80	3,026	347·3	19·17	3,039	556·8	17·11	3,092	654·6	12·94	3,146	894·2	13·35
	District	6,207	721·4	26·58	4,889	654·8	31·70	4,868	639·1	20·95	4,836	583·3	20·26	4,851	564·0	24·12
Burma	Central	6,823	510·6	13·34	6,691	460·3	14·05	6,962	381·1	21·69	7,491	278·9	17·62	7,797	246·6	13·59
	District	4,253	573·0	18·58	3,981	501·6	22·61	4,151	390·5	14·21	4,460	367·7	17·04	4,809	308·2	14·36
Total of the above Provinces.	Central	48,768	791·9	22·25	41,729	680·3	16·30	42,252	591·5	17·51	43,172	598·8	18·18	44,923	604·6	17·59
	District	47,803	839·3	23·20	41,833	848·1	23·24	42,922	791·3	17·99	43,203	723·2	20·39	44,598	736·3	20·16

As usual the numbers of convicts in central and district jails throughout India were nearly equal; but the central jail populations were larger than the district jail populations in Bengal, the Central Provinces, Madras and Burma; and as usual there were more prisoners in the district than in the central jails in Eastern Bengal and Assam, the United Provinces and the Punjab. As is generally the case the mean rate of admission to hospital was lower in central than in district jails, 604·6 against 736·3, but this relation of the death rates is fairly constant only in the United Provinces and Burma. As is always the case the mean death rate in central jails, 17·59, was lower than the mean in district jails, 20·16; but here again the provincial figures show that, although this relation is the common one in the different provinces, it is not invariable.

In 1906 the death rate of convicts in central jails was lower than in any year except in 1903 and 1904, and the death rate among convicts in district jails was lower than in any year except 1904.

Central and District Jails.—The following table shows the death rate among convicts in central and district jails according to duration of confinement.

Years.			Not exceeding six months.	Above six months and not exceeding one year.	Above one year and not exceeding two years.	Above two years and not exceeding three years.	Above three years and not exceeding seven years.	Above seven years.	Total.
1902.	Central Jails.	Strength ...	12,789	8,961	8,941	6,941	7,332	3,565	48,529
		Deaths ...	280	188	206	122	220	69	1,085
		Ratio per 1,000 of strength	21·9	21·0	23·0	17·6	30·0	19·4	22·4
	District Jails.	Strength ...	25,610	10,697	6,623	2,584	1,883	361	47,758
		Deaths ...	588	278	148	49	38	8	1,109
		Ratio per 1,000 of strength.	23·0	26·0	22·3	19·0	20·2	22·2	23·2
1903.	Central Jails.	Strength ...	11,122	7,463	7,970	5,715	6,862	2,486	41,618
		Deaths ...	181	112	137	91	122	37	680
		Ratio per 1,000 of strength.	16·3	15·0	17·2	15·9	17·8	14·9	16·3
	District Jails.	Strength ...	23,242	9,612	5,314	2,279	1,650	209	42,306
		Deaths ...	587	205	108	28	37	7	972
		Ratio per 1,000 of strength.	25·3	21·3	20·3	12·3	22·4	33·5	22·9
1904.	Central Jails.	Strength ...	11,446	7,605	8,328	5,642	6,749	2,475	42,245
		Deaths ...	196	132	151	70	140	51	740
		Ratio per 1,000 of strength.	17·1	17·4	18·1	12·4	20·7	20·6	17·5
	District Jails.	Strength ...	23,849	9,567	5,348	2,192	1,872	213	43,041
		Deaths ...	464	157	90	35	24	2	772
		Ratio per 1,000 of strength.	19·5	16·4	16·8	16·0	12·8	9·4	17·9
1905.	Central Jails.	Strength ...	12,322	7,963	8,606	5,733	5,936	2,925	43,483
		Deaths ...	203	143	141	76	174	48	785
		Ratio per 1,000 of strength.	16·47	17·96	16·38	13·26	29·31	16·41	18·05
	District Jails.	Strength ...	23,285	9,771	5,741	2,315	2,063	236	43,413
		Deaths ...	477	195	125	29	42	8	876
		Ratio per 1,000 of strength.	20·49	19·96	21·77	12·53	20·36	33·90	20·18
1906.	Central Jails.	Strength ...	13,611	8,288	8,297	5,820	5,898	3,107	45,021
		Deaths ...	207	146	141	107	146	43	790
		Ratio per 1,000 of strength.	15·21	17·62	16·99	18·38	24·75	13·84	17·55
	District Jails.	Strength ...	23,121	10,459	5,963	2,491	2,012	319	44,365
		Deaths ...	535	195	97	33	35	4	899
		Ratio per 1,000 of strength.	23·14	18·64	16·27	13·25	17·40	12·54	20·26

As in past years the highest mortality in central jails occurred among convicts who have been from 3 to 7 years in confinement, tubercle of the lungs being especially frequent among them. The highest mortality in district jails generally occurs among the newly admitted prisoners, and in an unhealthy year, such as 1906 was, the death rate among these prisoners is relatively higher than usual.

Causes of sickness and mortality.—The diseases which caused the highest admission rates were intermittent fever (admission rate 207·2 per thousand), dysentery (78·9), abscesses, ulcers and boils (68·9), diarrhœa (39·1), respiratory diseases other than pneumonia (25·2); and the most common causes of death, were dysentery (death rate 3·25 per thousand), tubercle of the lungs (3·21), pneumonia (2·55) and cholera (1·10).

Intermittent fever.—In 1906 the death rates attributed to fever among the general population were higher than in the previous year in every province except Madras, Bengal and Eastern Bengal and Assam, and throughout northern India the autumn months were exceptionally malarious. These circumstances enable us to judge of the value of the anti-malarial measures in force in the jails. The results obtained are at once encouraging and disappointing; encouraging because they show what can be done, disappointing because they show that some jail medical officers either do not believe in

the possibility of preventing malarial fever among prisoners or are half-hearted in carrying out the necessary measures.

The number of prisoners admitted to hospital on account of intermittent fever was 19,765, or 3,061 more than in 1905, and the admission rate was 207·2 per thousand, compared with 181·7 in that year. It is important to note that although the admission rate was higher than in the previous year, it was lower than it had ever been previously, and the deaths in 1906 numbered only 72 against 84 in 1905, and the death rate ·75 per thousand was, with the exception of the rate of ·66 in 1904, the lowest on record. Until June intermittent fever was much less prevalent than usual, but the numbers of cases rose rapidly in the third quarter of the year, reached the maximum in October and continued high until the end of the year. By far the highest admission rate was 809·2 per thousand in the North-West Frontier Province, where the prisoners suffered nearly three times as much from this disease as in the Punjab (291·8); in Madras and Burma the admission rates were only 60·2 and 49·7, respectively; elsewhere the rates ranged from 330·7 in Bengal to 139·3 in Bombay. In Eastern Bengal and Assam (death rate 2·77 per thousand), the North-West Frontier Province (1·54), the United Provinces (·88) and Bengal (·81) the death rates are higher than the mean, elsewhere they varied between ·50 in Bombay and ·19 in Madras. In parts of India in which kala azar is prevalent, cases of that disease are not infrequently diagnosed as intermittent fever; and the *post-mortem* records suggest that this mistake was made in 6 of the 25 fatal cases ascribed to intermittent fever during 1906. The necessity for care in diagnosis is obvious, and although the difficulty is often very great, the fact that fatal cases shown by the appearances after death to have been due to tuberculosis, pneumonia, pleurisy, pericarditis, meningitis, dysentery, chronic Bright's disease, cirrhosis of the liver and kala azar, were diagnosed as ague, shows that due care is not always observed.

Remittent fever.—There was a considerable increase in the number of cases of remittent fever admitted into hospital, the total rising from 109 in 1905 to 140, and the admission rate from 1·2 per thousand to 1·5. The monthly incidence of remittent fever varies from year to year and bears little relation to that of intermittent fever. In 1906 the highest admission rates were 2·9 in Bombay, 2·7 in Bengal and in the Central Provinces, 2·5 in Eastern Bengal and Assam, and 2·1 in Madras. In two of these provinces, Madras and Bombay, there is comparatively little intermittent fever, and in the North-West Frontier Province, where intermittent fever was most prevalent there was not a single case of remittent fever. The *post-mortem* records show that besides cases of malarial poisoning, and cases of kala azar, tuberculosis, pneumonia, etc., in which the diagnosis is evidently at fault, there is a residuum of cases which appear to be due to a fever that has not yet been differentiated in India.

Quinine prophylaxis and anti-mosquito measures are in force in every administration, but it is evident that the thoroughness of their application and, consequently, the degree of success attained, varies greatly, not only in the several provinces, but in the different jails in each province.

Inspectors-General give very little information concerning the arrangements in force in their administrations, indeed in only one report is it stated what dose of quinine is given. In the Punjab 15 grains of quinine are given to each prisoner every six days, but the dates between which the issue of quinine is made are not stated; Lt.-Colonel Braide, whose experience has made him an enthusiastic advocate of quinine prophylaxis, ascribes all failure to faulty arrangements.

If the importance of reducing the number of cases of malarial fever in jails and the possibility of effecting this by anti-malarial measures are admitted, it follows that these measures should be adopted in all malarious localities, and it should be recognized that the prophylaxis of malaria is as much a part of efficient jail management as the suitable dieting of the prisoners. It has been shown over and over again that the success of anti-malarial measures, and particularly of prophylaxis by the regular administration of quinine, depends entirely upon attention to detail and the personal supervision by the medical officers under whose immediate orders the measures are carried out, and it seems therefore that it should no longer be left to the discretion of medical officers to determine whether measures are or are not to be adopted in particular jails, but that the Inspector-General should lay down for each jail in his administration exactly what measures are to be carried out, the dates between which these measures are to remain in force and the precautions to be observed to guard against failure. Effective procedures to destroy mosquitoes must vary with the surroundings of the jail; and, as all localities are not equally malarious, the dose of quinine and the intervals of time between doses should be regulated to meet

the requirements of each case, the rule being to give the smallest dose of quinine that will be effective, while the importance of reducing the unpleasant effects of quinine by the selection of the most suitable salt and by skilful compounding should not be overlooked. Above all things the procedure of dosing the prisoners should be so carefully detailed and supervised that no prisoner whom it is intended to subject to prophylactic treatment should by any possibility escape taking his dose.

Dysentery.—There were 7,525 admissions to hospital and 310 deaths ascribed to dysentery during 1906, compared with 7,496 admissions and 277 deaths in the previous year. The jail population of 1906 was, as we have seen, considerably larger than in 1905, and the admission rate fell from 81·6 per thousand to 78·9. There was a notable increase in the frequency of dysentery cases in Madras, Bombay, the Punjab and the North-West Frontier Province, but this was more than balanced by the decline in the numbers of cases in Eastern Bengal and Assam and Burma. The death rate was 3·25, or ·24 per thousand higher than in 1905; the rise was common to all provinces except Burma, where the rate fell from 2·60 to 1·50 per thousand, and Bengal where it fell from 6·56 to 5·72, the most important rise being from the singularly low rate of ·52 recorded in the Punjab in 1905 to an average provincial rate of 2·64 per thousand.

In India generally, as in previous years, the disease was most prevalent in August and least prevalent in February: this is the distribution of the incidence of dysentery in most provinces year after year with the following exceptions, in Bombay the lightest incidence is generally in March; in Madras in April; and in the Central Provinces in May; the heaviest incidence occurs in Burma in July, in Eastern Bengal and Assam in August; in Bombay in July or August; in the United Provinces in August or September; in the Punjab and Madras irregularly, in the former generally, and in the latter always, dysentery cases are most frequent in one of the last four months of the year.

Diarrhœa.—The number of cases of diarrhœa admitted to hospital was 3,734, of which 70 terminated fatally, the admission and death rates being, respectively, 39·4 and ·73 per thousand, compared with 39·2 and ·74 in 1905. The highest admission rates were 84·9 in Bengal and 73·5 in Eastern Bengal and Assam, and the lowest 3·3 in Madras; while the highest death rate was 1·36 per thousand in the Punjab, and the lowest ·10 in Madras. The mean case-mortality in all the jails was 1·9 per cent., but in the different administrations this percentage varied greatly, from 4·5 in Burma and 3·5 in the United Provinces, to ·88 in the Central Provinces and ·79 in Eastern Bengal and Assam.

Respiratory diseases.—The number of admissions to hospital on account of these diseases fell from 2,428 in 1905 to 2,400, and the number of deaths from 85 to 68. The admission and death rates fell from 26·4 and ·92 per thousand to 25·2 and ·71, the reduction in the former being mainly due to the great decrease in the frequency of these diseases in the Punjab, and in the latter to the lessened death rate in Bengal, the Punjab and the Central Provinces. In the North-West Frontier Province the admission rate rose from 12·2 per thousand in 1905 to 35·4, and the death rate from ·76 to 1·54. Of the 68 deaths, 25 were due to bronchitis, 11 to gangrene of the lungs, 10 to broncho-pneumonia, 7 to pleurisy, 5 to spasmodic asthma and 3 to empyema.

Pneumonia.—There was a considerable increase in the number of cases of pneumonia, the total rising to 963, as compared with 896 in 1905, and 963 in 1904. The admission rate in 1906 was 10·1 per thousand compared with 9·7 in the previous year and the death rate 2·55 compared with 2·28. The frequency and fatality of the disease in the different provinces as usual varied greatly, the highest admission rates being 23·8 per thousand in the North-West Frontier Province and 15·4 per thousand in Bombay, where the Sind jails were responsible for the high rate, and the lowest 7·4 per thousand in Madras and 4·2 in Burma; while the death rates ranged from 3·85 per thousand in the North-West Frontier Province and 3·66 in Bombay, to 1·63 in Madras and 1·20 in Burma and the Central Provinces. The mean case-mortality was 25·23 per cent., the percentages ranging in the several provinces from 35·48 in Eastern Bengal and Assam to 16·13 in the North-West Frontier Province.

Tubercle of the lungs.—There were 844 admissions to hospital and 306 deaths from tubercle of the lungs, compared with 803 admissions and 293 deaths in 1905. The admission rate, which in 1904 had been 8·4 and in 1905, 8·7, per thousand rose to 8·8, and the death rate, 3·21, was fractionally higher than in any of these years. As compared with 1905, the disease was less frequent in the jails of Eastern Bengal and Assam, the Punjab, the Central Provinces, Bombay and Madras, but it was more fatal in Burma

Bengal, the United Provinces and Madras. The highest admission rate was as usual recorded in Bengal, 15·1 per thousand; the next highest being 9·7 in Madras and 9·5 in Eastern Bengal and Assam, and the lowest 3·9 in the Central Provinces. The highest death rates were 4·31 in Bengal and 4·19 in Burma, and the lowest 1·80 in the Central Provinces and ·77 in the North-West Frontier Province.

An examination of the statistics of the last ten years, due allowance being made for changes in nomenclature and modification in practice, shows that while the limits of the fluctuations in the admission and death rates are fairly characteristic in each province, these fluctuations are considerable from year to year, and the rates show no constant tendency to decline. This is disappointing because it might have been expected that the removal of predisposing causes by improved sanitation—free ventilation, better food, more suitable clothing and the reduction in the numbers of malarial attacks—and the preventive measures which have been generally adopted, would have reduced the numbers of cases and the fatality of the disease. On the other hand, there is no sign that tubercle of the lungs is becoming more frequent, and, indeed, there is reason to think that a real reduction in the frequency of the disease is disguised by the results of earlier and more accurate diagnosis. The mean case-mortaliy has steadily fallen from 43 per cent. in 1900 to 36 per cent. in 1905 and in 1906, and the stay in hospital of fatal cases is becoming longer—although in the different provinces the length of time between the diagnosis of the disease and death varies greatly. It is mainly to the result of early diagnosis that we must look for improvement in the future. It is obvious that the earlier a case is recognized the more hopeful is treatment and the less the danger of infection from it; but the number of instances in which the *post-mortem* records show that the presence of tubercle was not detected until after the death of the sufferer shows that even more care than is at present taken is necessary.

Anæmia and Debility.—The number of cases of anæmia and debility admitted into hospital in 1906 was 1,193 and there were 52 deaths, compared with 1,014 cases and 50 deaths in the previous year. The mean admission rate which in 1905 was 11·0 per thousand, rose in 1906 to 12·5; but in the different provinces the rates varied enormously from 39·3 in Eastern Bengal and Assam and 25·4 in the North-West Frontier Province, to 5·0 in Madras and 2·5 in Burma. The mean death rate rose from ·54 per thousand in 1905 to ·55, the highest and lowest rates being 1·54 and ·07 in the North-West Frontier Province and Burma, respectively; elsewhere they ranged from ·88 in Bombay to ·24 in the United Provinces. Anæmia and debility is, it must be admitted, a convenient heading for medical subordinates, and in provinces where a large proportion of the prisoners are confined in small district jails it is difficult to avoid its use, but resort to it should be discouraged as much as possible, not only because it leads to slovenly practice and ineffectual treatment, but because the use as a definition of a term which describes symptoms common to many diseases must lead to difficulty in the future in ascertaining the effects of hygienic improvement in reducing the prevalence of these diseases. We know, for instance, that the increase in the frequency of tubercle of the lungs in the jail statistics in the years immediately preceding 1900 was largely due to cases of anæmia and debility being correctly diagnosed as tubercle, but owing to the loose way in which the term "anæmia and debility" had been used to describe other diseases, it was not possible to be sure that there had not been a real increase in the number of cases of tubercle in the prisons. Of the 52 deaths ascribed in 1906 to anæmia and debility, 21 were considered by the medical officers to be due to old age. In 36 cases *post-mortem* examinations were made which show that in 6 instances death was probably due to dysentery, in 3 to tubercle of the lungs, in 2 to disease of the kidneys; in the remaining 25 cases such details of the examination as are given throw little light on the cause of death.

Small-pox.—There were 82 admissions and 9 deaths from small-pox, against 31 admissions and 4 deaths in 1905. Twenty-six of the cases occurred in the United Provinces, 15 in Bengal, 13 in Madras and 11 in Burma. The mean death rate from small-pox was ·09 per thousand.

Plague.—The number of plague cases fell from 66 in 1905 to 19, and the deaths from 46 to 8. Seven cases occurred in three jails in Bengal, 6 cases in three jails in the Punjab, 3 cases in two jails in Bombay, 2 cases in one jail in Burma and 1 case in the United Provinces.

Cerebro-spinal fever.—There were 12 cases, all fatal, diagnosed as cerebro-spinal fever, an increase of 2 on the total of 1905, but the facts ascertained at the careful *post-mortem* examinations, which were performed in every instance, did not always support

the diagnosis, and it is possible that the cause of death in two cases was a tumour pressing on the brain, in two others pyæmia and in one other pneumonia. In two cases the diagnosis was confirmed by bacteriological examination.

Enteric fever.—The number of cases diagnosed as enteric fever is increasing every year. In 1904 there were 55 cases and 14 deaths, in the following year 64 cases and 15 deaths, and in 1906 the number of cases rose to 102 and the number of deaths to 18. In Madras 61 cases and 7 deaths occurred, and in Eastern Bengal and Assam 20 cases and 5 deaths. No information is available regarding the signs and symptoms presented by the cases that recovered, but in the fatal cases these were typical, in 7 of them perforation occurred, and in all of them extensive ulceration of Peyer's patches was found.

Cholera.—These were 186 admissions and 105 deaths from cholera, compared with 73 admissions and 40 deaths in 1905. The mean death rate was 1·10 per thousand, and rates in excess of the mean were recorded in Madras (4·32), Bombay (2·27), and Eastern Bengal and Assam (1·89). The only administrations entirely free from cholera were the Punjab and the North-West Frontier Province. The more important outbreaks occurred in the Common Prison, Bombay (36 cases and 15 deaths), in the central jail at Coimbatore (25 cases and 12 deaths). In the district jail at Gauhati there were 7 cases and 6 deaths and in district jails at Azamgarh and Bankura, respectively, 5 cases and 2 deaths.

The following paragraphs contain brief notes of more important matters discussed in the provincial reports by the Inspectors-General and in the sanitary sheets of their various jails.

Bengal.—Lack of sufficient accommodation is a serious defect in the majority of jails in this administration, and there was over-crowding during a part or the whole of 1906 in 28 of the 35 jails. Many of the jails are badly situated in the centre of a town or bazaar and "site over-crowding" is a defect commonly reported. There are still some sleeping barracks in which there are four rows of beds and more than one in which there are six rows. The medical officer of the Purneah jail reports that in the wards of this jail nine prisoners sleep between two ventilating openings. Many improvements, however, were effected during the year under review, and many others are in progress. A new Presidency jail for Europeans and Natives is being built at Calcutta; the ventilation of the wards in the Midnapore central jail is being improved at a cost of more than a lakh of rupees; the areas of the jails at Balasore, Bankipore and Arrah have been, or are being, extended; new segregation wards have been added to the jails at Puri and Darjeeling, a new hospital to the Monghyr jail and new wards to the hospital of the Jessore jail; improvements to wards and worksheds are in progress in the Krishnagar jail; and schemes are in hand for more buildings to relieve over-crowding or for additional hospital and other accommodation or for improving the ventilation of barracks in the jails at Alipore, Purneah, Cuttack, Purulia and Ranchi.

The mean daily population of the jails in 1906 was considerably higher than in 1905, but while the rate of admission into hospital rose from 953·5 per 1,000 in 1905 to 1008·8 per 1,000 in 1906, the death rate fell from 24·91 to 23·36 per 1,000. The principal causes of admission into hospital were intermittent fever (32·78 per cent. of all admissions), dysentery (18·59) and diarrhœa (8·41); and the principal causes of death, dysentery (24·5 per cent. of all deaths), tubercle of the lungs (18·4) and pneumonia (12·7). Intermittent fever was responsible for an admission rate of 330·7 per 1,000 as compared with a rate of 290·7 in 1905, but there were only 12 deaths among 4,913 cases (·24 per cent.) as compared with 39 deaths among 4,120 cases (·95 per cent.) in 1905. This reduction in case-mortality may have been due in part, as the Inspector-General thinks, to the use of quinine as a prophylactic, or it may have been due to more careful diagnosis; the latter explanation seems the more probable for there is no indication that the prophylactic administration of quinine was carried out more stringently in 1906 than in the previous year; and an examination of the *post-mortem* records shows that even in the year under review malarial fever was not the cause of death of all patients whose diseases had been returned under this heading; in at least one instance the cause of death was very probably kala azar and in another it was possibly tuberculosis. Quinine was issued as a prophylactic in all jails and the Inspector-General remarks that "a majority of medical officers report favourably on it". Dysentery was responsible for an admission rate of 187·6 per 1,000 and a death rate of 5·72 per 1,000 as compared with rates of 196·4 and 6·56 per 1,000, respectively, in 1905. There was considerable over-crowding during the greater part of the year in some or all of the barracks of the five jails in which the highest admission rates on account of this disease were recorded, and all are more or

less defective structurally. Tubercle of the lungs caused 275 admissions into hospital and 64 deaths as compared with 192 admissions and 59 deaths in 1905. The rate of admission into hospital has increased considerably during recent years and although the death rate remains about the same there has been a steady reduction from year to year in the case-mortality. In all probability this does not mean that the prevalence of the disease is on the increase among prisoners in the Bengal jails, but that patients suffering from tubercle are discovered and admitted into hospital at an earlier stage than formerly was the case. The Inspector-General hopes to be able to utilize the jail at Berhampore as a special jail for prisoners suffering from this disease.

The death rate in four jails was over 40 per 1,000. The high death rates in the Naya Dumka and Purulia jails were attributed by the medical officers chiefly to overcrowding, and in the Chaibassa jail it was attributed by the Inspector-General to bad management, in that sufficient use was not made of the hospital.

Eastern Bengal and Assam.—The average strength of the prisoners in the jails of Eastern Bengal and Assam rose from 6,401 in 1905 to 6,871 in 1906, and, with the exception of the jails at Tezpur and Sylhet, all were more or less overcrowded during a part or the whole of the year. The admission rate, the constantly sick rate and the death rate, however, were lower than in the previous year, being 912, 43, and 29·69 per 1,000, respectively, as compared with 1,081, 46 and 32·96. The chief causes of admission into hospital were dysentery (26·56 per cent. of all admissions) and intermittent fever (25·75) and the chief causes of death, dysentery, pneumonia and tubercle of the lungs. There were 19 deaths among 1,613 patients admitted for intermittent fever, the case-mortality (1·18 per cent.) being considerably higher than in any other province. The *post-mortem* records suggest that at least five of the deaths were due not to malarial fever but to kala azar, and it is unfortunate that despite the attention which lately has been directed to this disease, especially in Assam, medical subordinates still appear to be ignorant of its symptoms. A patient whose temperature keeps at or above 104° F. for 20 days in spite of his having received 30-40 grains of quinine daily, as happened in one case diagnosed as "ague" at Mangaldai, cannot possibly be suffering from malarial fever. Twenty cases of enteric fever with 5 deaths were recorded during the year and 14 cases of cholera with 13 deaths. Fourteen of the cases of enteric fever occurred at Mymensingh, where a small epidemic had begun in December 1905. The cases of cholera occurred at Gauhati (7), Dacca central jail (5), Tippera (1) and Dinajpur (1). The principal improvements effected in the jails of this administration during the year were the construction of new hospitals at Mymensingh and Malda, new segregration and under-trial wards at Chittagong, and a new civil jail and a new ward for females at Barisal.

United Provinces.—The health of the general population of the United Provinces was fairly good during the early part of 1906, but during the autumn and winter months malaria was more prevalent than usual. In a few districts famine conditions were present until the onset of the rains. The average strength of the jail population was 24,872 as compared with 23,680 in 1905, and about 20 jails were somewhat overcrowded during part of the year. The sanitary condition of all the jails was reported by the Inspector-General to be good and the medical officers of only a very few jails reported any defects in accommodation, ventilation, or drainage. Only about 16 of the 57 jails in this administration are, however, situated a quarter of a mile or more from inhabited areas, and "site overcrowding" is a defect of some jails. In 1906 the admission rate, constantly sick rate and death rate were 603, 27 and 16·56 per mille, respectively, as compared with 569, 27 and 17·31 per mille in 1905. Intermittent fever, dysentery, and tubercle of the lungs were more prevalent than in the previous year, but the fatality of dysentery, as judged by the death rate per thousand and by the case-mortality, was less than in any previous year. The rates of sickness and death from tubercle of the lungs in this administration have been remarkably similar for many years, but the Inspector-General is of opinion that the disease is less prevalent in the jails than formerly. Every effort is made to segregate tuberculous patients and there are special wards where the open air treatment can be efficiently carried out in all central jails. Death rates over 30 per 1,000 were recorded in five jails where the average annual strength was over 100, the highest rates among the prisoners in these five jails being 46·24 per mille recorded in the Ghazipur district jail, 36·59 in the Orai district jail, and 35·97 in the Hamirpur district jail. The Inspector-General remarks that there was a large proportion of old men in the Ghazipur jail, and that on account of the high price of grain in the district a large number of weak and aged people sought refuge in the jail to save themselves from starvation. In the Orai district also famine conditions prevailed. The death rate in the Meerut district

jail was 33·39 per 1,000, the deaths including five among eight prisoners admitted into hospital for tubercle of the lungs and six among eight admitted for pneumonia. Cholera was epidemic among the general population during the greater part of the year and was introduced into nine jails, but the measures taken effectually prevented an epidemic among the prisoners and only 17 cases with 11 deaths were recorded in all the jails.

Punjab.—It appears from the reports of medical officers that there are no serious defects in accommodation or in the ventilation of barracks in the great majority of the jails in the Punjab, and only in the jails at Montgomery, Lahore, Mooltan and Hoshiarpur was there any serious over-crowding during 1906. The average strength of the jail population was 11,744 in 1906 as compared with 11,512 in 1905, and although there was a slight increase in the rate of admission into hospital the death rate fell from 16·33 to 15·75 per thousand, which is the lowest rate recorded since 1896. Intermittent fever was the principal cause of admission into hospital, but there were only 4 deaths among the 3,427 cases classed under this heading, the case-mortality ('12 per cent.) being considerably lower than that in any other administration. Tubercle of the lungs, pneumonia, and dysentery were the principal causes of death, being responsible for 24·3, 16·8 and 16·8 per cent., respectively, of the total number of deaths recorded. Despite the absence of over-crowding and the good arrangements which exist in most of the jails, tubercle of the lungs was as usual considerably more fatal than in the jails of any other administration. In the Lahore central jail, where special arrangements for the treatment of patients suffering from tubercle exist, the case-mortality was as high as 66 per cent. Whether the recorded high proportion of deaths to cases means that tubercle of the lungs is a more fatal disease in the Punjab than in other parts of India, or whether it is due to the non-discovery of cases in an early stage cannot be definitely decided; the latter is a possible explanation which perhaps gains some support from the fact that "anæmia and debility" is not infrequently recorded as the cause of death in the Punjab jails. Dysentery was considerably more prevalent and more fatal than in 1905. The Inspector-General draws attention to the connection between this disease and scurvy and points out that in some jails where dysentery was prevalent a "scorbutic taint" certainly existed. Pneumonia caused 130 admissions into hospital and 31 deaths as compared with 164 admissions and 29 deaths in 1905. No case of cholera occurred during the year and only six cases of plague (two of which were fatal) and seven of small-pox.

North-West Frontier Province.—In the jails of this administration there is accommodation for 1,515 prisoners of all classes, but although the average strength of the jail population during 1906 was only 1,300 (as compared with 1,314 during 1905) there was over-crowding in the Peshawar jail for 201 days, in the Bannu jail for 191 days, in the Kohat jail for 100 days and in the Abbottabad jail for 94 days. The year was an unhealthy one and the rates of sickness and mortality among the prisoners were considerably higher than they have been for many years. Intermittent fever caused 55·25 per cent. of the total admissions into hospital, the admission rate being higher than in any year since 1897. Quinine was issued as a prophylactic and the fact that it did not appear to have much effect in warding off attacks may have been due, in the Inspector-General's opinion, to its administration not having been begun sufficiently early in the malarial season. Dysentery caused 102 admissions into hospital as compared with 60 in 1905, tubercle of the lungs 10 as compared with five, and pneumonia 31 as compared with 18. Influenza was prevalent in the Peshawar jail and accounted for 38 admissions into hospital and seven deaths.

Central Provinces and Berar.—The average strength of the jail population fell from 3,547 in 1905 to 3,329 in 1906, but there was occasional over-crowding mostly in the under-trial wards, in eight jails. The admission, constantly sick, and death rates all fell, the death rate, which was 13·82 per thousand, being lower than that recorded in any other administration during 1906. Intermittent fever, abscesses, dysentery, and diarrhœa were the principal causes of admission into hospital, and dysentery, tubercle of the lungs and pneumonia the principal causes of death. Intermittent fever caused 32·90 per cent. of the total admissions from all causes. The Inspector-General reports that quinine is used as a prophylactic in some jails, but not in others. Dysentery caused 7 deaths, tubercle of the lungs 6 and pneumonia 4. In the Central jail at Jubbulpore there was no admission into hospital for dysentery or for diarrhœa during the year. In all the jails diarrhœa caused 113 admissions into hospital and one death, compared with 128 admissions and one death in 1905.

Madras.—The daily average strength, which was 9,320 in 1904 and 10,147 in 1905, increased in 1906 to 10,428. The admission rate fell from 469 to 417 per mille, and the

constantly sick rate from 19 to 18 per mille, but the death rate rose from 15·87 per mille in 1905 to the comparatively high figure of 21·77 per mille in 1906. This was due mainly to the occurrence of cholera, the death rate from which was higher than in any year since 1897. This disease attacked the prisoners in eight jails and caused in all 82 admissions into hospital and 45 deaths. There were 25 cases with 12 deaths at the Coimbatore central jail, 20 cases with 6 deaths at the Madura jail, 18 cases with 11 deaths at the Russelkonda jail and 12 cases with 6 deaths at the Rajahmundry central jail. In at least one instance the disease was introduced into a jail, not by newly admitted prisoners, but by warders or other jail officials who had visited infected areas, and the Inspector-General draws attention to the advisability of limiting the movements of warders during times of epidemic. The water-supply of the Rajahmundry central jail is apparently faulty and the Inspector-General reports that it becomes polluted periodically. Dysentery which caused 18·72 per cent. of the total admissions into hospital, and intermittent fever which caused 14·46 per cent. were the principal causes of sickness, and cholera (19·8 per cent. of all deaths), dysentery (19·8 per cent.), tubercle of the lungs (11·5) and pneumonia (7·5) the principal causes of death. The death rate from dysentery was higher than in any year since 1898. The Inspector-General remarks that there is reason to believe that in many jails the grain is not always thoroughly freed from gravel before being ground and that the use of soft mill stones must add largely to the amount of grit present in the flour. There was only a very slight increase in the death rate from tubercle of the lungs as compared with the previous year, and as usual the comparatively low fatality of this disease in the Madras jails is a satisfactory feature of the statistics. At Trichinopoly, where there is a special ward for open air treatment, 23 patients suffering from tubercle were admitted, and of these only 4 died during the year; at Bellary also only 4 of the 20 tuberculous patients admitted into hospital died. In this jail a special ward for the treatment of patients in the open air is being constructed.

Bombay.—The daily average population of the jails in Bombay increased from 7,851 in 1905 to 7,925 in 1906, and the admission, constantly sick and death rates rose from 608 to 689, from 27 to 31 and from 17·45 to 20·69 per thousand, respectively. The principal cause of sickness was ague which accounted for 20·21 per cent. of the total admissions into hospital and the principal causes of death were pneumonia and cholera, the former accounting for 17·7 per cent. of all deaths and the latter for 11·0 per cent. There were in all 45 cases of cholera with 18 deaths, the chief outbreaks occurring in the Bombay Common Prison (36 cases and 15 deaths) and in the Yerrowda central prison (8 cases and 3 deaths). An under-trial prisoner was the first person attacked in the Common Prison and the outbreak was confined to persons living in the barrack of the quarters for under-trial prisoners. There was an interval of five days between the occurrence of the first and second cases and the same interval between the second and third. This case occurred on the 13th of November and between this date and the 18th, 28 prisoners were attacked. The evidence appeared to indicate that the germs of the disease had been introduced in the food of under-trial prisoners. Food brought into the jail from an infected area was also suspected to be the cause of the outbreak in the Yerrowda prison. The diagnosis in three of the cases which occurred in this prison was confirmed by a bacteriological examination made at the Parel laboratory. Pneumonia caused 122 admissions into hospital and 29 deaths and dysentery 434 admissions and 16 deaths, both diseases having considerably higher death rates than in 1905. Pneumonia was, as usual, chiefly prevalent among the convicts of the Sind Gang, who are employed on railway work and are exposed to all weathers. Their barrack accommodation has been increased and more efficient means of ventilation provided; they are not sent out to work until a late hour of the morning and not until they have received some hot food; all their clothing and bedding is numbered; those patients suffering from pneumonia are promptly isolated, and their bedding and clothing burned.

The Shikarpore jail was closed at the end of November 1906, all the prisoners being moved to Sukkur.

Burma.—No defect in accommodation or ventilation was reported during 1906 by the medical officers of 28 of the 32 jails in Burma, but there was more or less over-crowding in 17 jails, and in 20 jails there is no separate hospital accommodation for the isolation of cases of infectious disease. The average strength of the jail population which was 12,639 in 1905 rose to 13,369 in 1906, but the admission, constantly sick and death rates fell from 320, 17 and 17·01 per thousand, respectively, in 1905 to 280, 16 and 14·81 per thousand. The three rates were the lowest on record for Burma. Intermittent fever and abscesses were the chief causes of sickness, and tubercle of the lungs, dysentery and

pneumonia the chief causes of death. The admission rate on account of intermittent fever was only 49·7 per mille, which is far lower than that recorded in any other administration. Apparently quinine was used prophylactically in most jails, but the doses given and the plans adopted to secure proper administration are not stated. "Mosquito brigades" were organized in some jails. It is mentioned by the Inspector-General that at Rangoon only those cases are returned as intermittent fever in which malaria parasites are found by microscopic examination of the blood, and this probably accounts for only 18 cases being recorded as having occurred during the year in this jail as compared with 124 cases of simple continued fever. At Insein, which is near Rangoon, this practice is not adopted and here 101 cases of intermittent fever were recorded, and not a single case of simple continued fever. There were 114 cases of tubercle with 56 deaths, the case-mortality for the year being higher than in any other administration except the Punjab. The Inspector-General states that arrangements are made for the segregation of all patients suffering from this disease and that the open air system of treatment is carried out as far as local conditions permit. Apparently all the patients during 1906 were treated in jails where there is ample accommodation for carrying out these measures, but the results were disappointing, and in the Rangoon central jail, where there is a special ward capable of accommodating 34 tuberculous patients, 18 of the 22 patients admitted during the year died. There was a satisfactory decrease in the sickness and mortality from dysentery. The great majority of cases of this disease occurred in the central jails at Thayetmyo and Myingyan and the Inspector-General is of opinion that in the former jail the cause was the impurity of the water-supply, which at present is obtained from the Irrawaddy river. A scheme for the improvement of the present supply and another for providing a supply from a new source are under consideration. Seven cases of cholera (with 3 deaths) and 2 of plague (one fatal) occurred during the year. Only one prisoner suffered from beri-beri which he had contracted before his admission to jail.

The diets issued to prisoners were the same as in the previous year, and the Inspector-General attributes a considerable share in the marked improvement shown in the health of the prisoners during recent years to the great attention which has been paid to the food supply.

Ajmer, Mercara, Quetta and Secunderabad.—In the jail at Ajmer there was overcrowding for eleven months of the year. The water-supply from the jail wells was insufficient and had to be supplemented by purchasing water from the municipality. The average annual strength of the jail population was 465, and 192 admissions into hospital and 10 deaths occurred during the year, giving ratios of 412·9 and 21·51 per thousand, respectively, as compared with 390·8 and 16·99 in 1905. There were 10 cases of guinea worm. In the Mercara jail, where the average annual strength was 95, there were 10 deaths during the year, three being due to pneumonia, three to diarrhœa, and one each to hepatitis, hydatid of the liver, heart disease and old age. At Quetta, where the average annual strength was 58, there was no death, and at Secunderabad (the average annual strength being 81) there were two, of which one was due to acute mania and the other to epilepsy.

Andamans.—In 1906 the rainfall recorded at the observing station in the Andaman Islands was 99·23 inches, nearly 2 inches less than in the previous year and 22 inches less than the mean of the previous five years. There was a further increase of the convict population, the average strength being 14,688 or 340 more than in 1905. Accommodation was increased by the erection of 15 temporary barracks, and each convict has now 50 square feet surface area in a large well-ventilated barrack. There was no over-crowding except occasionally in the hospital. The improvement in the food supply to which reference was made in last year's report was maintained; the supply of wheat has been improved, the issue of *urad* dhall has been discontinued, and *mung* dhall is given three times and *urhur* dhall four times a week to all labouring convicts. Water is obtained from tanks, wells and springs and is boiled at all the large stations; condensed water is supplied for drinking purposes to the inmates of the 'female' and cellular jails. The Senior Medical Officer recommends the introduction of filter beds at Hope Town and the fitting of a covering of galvanised iron to all the wells in the Settlement.

The admission rate rose from 1,898 to 2,041 per thousand and the constantly sick rate from 68 to 70, but there was a remarkable fall in the death rate from 38·96 per thousand in 1905 and a quinquennial mean of 37·38, to 27·30, the fall being due almost entirely to the reduction in the number of deaths from dysentery.

The number of admissions to hospital on account of dysentery fell from 2,359 in 1905 to 1,381, and the number of deaths from 187 to 72, the admission and death rates

falling, respectively, from 164·4 and 13·03 to 94·0 and 4·90, rates which are comparable with those recorded in Indian prisons. The improvement is ascribed by Major Fearnside to precautions taken to prevent infectious matter getting into water-supplies and to improvement in the quality of the food. The admission rate for tubercle of the lungs fell from 11·4 to 6·9 per thousand, and the death rate from 6·48 to 5·58. The admission rate on account of pneumonia, however, rose from 11·0 to 15·8 per thousand, and the death rate from 4·81 to 5·38; the greater prevalence of this disease being due to an epidemic of influenza. There were 385 cases of influenza admitted to hospital during the year, and fatal pneumonia followed the attack in 47 instances.

Intermittent and remittent fevers were the cause of 21,362 admissions and 51 deaths, the admission rate, 1,454·4 per 1,000, and the death rate, 3·47, being both lower than in 1905. Anti-mosquito measures are stated to have freed the Island of Ross from malaria, and are being undertaken elsewhere. The temporary barracks are infested by anopheles mosquitoes, and the Senior Medical Officer would replace these thatched structures by permanent barracks whenever funds permit. Major Fearnside notes the frequent occurrence of a fever, lasting from three to ten weeks; no malaria parasites are present in the blood, and the disease which is clinically distinct from enteric fever, resembles Malta fever.

Conclusion.—The maintenance of favourable statistics of the health of the prisoners in spite of the unhealthy character of the year is most satisfactory; it shows that the high standard of care and skill reached by the Inspectors-General and the staff of the prisons is not only being maintained but is being raised; and it justifies the hope that in the near future there will be a still further reduction in prison mortality.

The General Population.

(For Statistical Tables—*see* pages 129—131.)

Births in India.—The populations of the areas in which births were registered in the Indian Empire in 1906 aggregated 223,511,195 according to the census of 1901, and the number of births registered during the year was 8,448,478.

As the date of the census recedes it is evident that the birth and death rates calculated upon the census populations become less accurate; where there has been an increase in the population the calculated rates are too high, but in Indian statistics corrections for this error are difficult to make, because owing to the large fluctuations in the numbers of births and deaths which occur from year to year the changes in the numbers of the different populations are irregular, and because the addition of the increase or subtraction of the decrease deduced from the registration figures would mislead in proportion to the defects in registration. There are defects in the registration nearly everywhere, and in some places the defects are very serious. Improvement in registration is, however, being steadily effected, and in some of the provinces the errors in the numbers of births and deaths registered are comparatively small, although the causes of death are everywhere, except in a few of the greater cities, incorrectly reported.

The calculated birth rate in 1906 was 37·80 per thousand compared with 39·13 in 1905 and 38·41 the average of the five years ending with 1905. The provincial rates ranged from 51·72 per thousand in the Central Provinces and Berar, to 30·9 in Madras and 28·91 and 26·10 in the small provinces of Ajmer-Merwara and Coorg, respectively. In all provinces except Bombay, the North-West Frontier Province and Coorg the birth rates of 1906 were lower than those of the preceding year, but the only variations over 2 per mille were an increase of 3·2 per mille in the North-West Frontier Province, and decreases of 8·41 in Ajmer-Merwara, of 2·30 in the Central Provinces and Berar, of 2·23 in Bengal and of 2·01 in Lower Burma. In all provinces, except three, the birth rates were higher than the death rates, the most considerable excesses being 8·25 per thousand in the Central Provinces and Berar, 6·8 in the Punjab, 5·71 in Eastern Bengal and Assam and 5·18 in Lower Burma. The three provinces in which the birth rates were exceeded by the death rates, were Bombay, Ajmer-Merwara and Coorg. In Bombay the birth rate of 1906, although low, was higher than the mean of recent years, the death rate was high owing to the persistence of plague and the unusual prevalence of cholera, fevers and bowel complaints. In Upper Burma birth registration is confined to a few towns and is exceedingly defective, death registration is general and is less defective. In Ajmer-Merwara the birth rate was unusually low in 1906, and in Coorg, owing to the deficiency of females in the population, the birth rate is always low. The mean percentage of male to female births was 106·88, the percentages ranging from 118·8 in the North-West Frontier Province to 104·4 in Madras and 97·28 in Coorg.

Deaths in India.—The populations among whom deaths are registered aggregate 226,125,682 according to the census of 1901; the excess over the number among whom births are registered being due to the inclusion of 2,614,487 persons in Upper Burma among whom births are not at present registered. The number of deaths registered during 1906 was 7,852,330 compared with 8,117,771 in 1905, and the death rate fell from 35·96 per thousand in that year to 34·73, the decrease being due to the great decline in the mortality from plague, while the mean for the quinquennium ending 1905, was 32·91. The fall in the general death rate was, however, due to lessened mortality in the more populous provinces of Northern India; in Madras, Bombay, Burma, the Central Provinces and Berar, the North-West Frontier Province and Coorg the death rates of 1906 were higher than those of 1905. The highest death rates were 43·47 per thousand in the Central Provinces and Berar and 39·07 in the United Provinces, and the lowest 27·15 in Lower Burma, 27·4 in Madras, and 26·22 in Upper Burma. In every province except Bengal and Eastern Bengal and Assam, the urban mortality was higher than the rural.

The greatest mortality occurred in October, November and December and the least in February and March. In most provinces the male death rates were higher than the female death rates, but the United Provinces, the Punjab, the North-West Frontier Province, Ajmer-Merwara and Coorg were exceptions to the general rule.

Male infants died at the rate of 228·30 per thousand born and female infants at the rate of 217·52, compared with rates of 231·11 and 217·72 in 1905. In the provinces the highest male infantile mortality was 317·5, per thousand born, in Ajmer-Merwara and 292·6 in the Central Provinces and Berar and the lowest 205·9 in Eastern Bengal and

Assam and 200·0 in Madras. The same positions are taken by these provinces in respect of female infantile mortality, the highest rates were 317·9 and 266·35 per thousand born in Ajmer-Merwara and the Central Provinces and Berar, and the lowest 187·7 in Eastern Bengal and Assam and 182·1 in Madras. In all provinces except Coorg, as we have seen, the birth rates of males were higher than the birth rates of females, but in the United Provinces, the Punjab, the North-West Frontier Province and Ajmer-Merwara, the death rates of female infants were higher than the death rates of male infants.

Cholera was present in every province except the North-West Frontier Province, and was severe in Madras (death rate 3·9), Bengal (3·81), Eastern Bengal and Assam (3·63), the Central Provinces and Berar (3·26), the United Provinces (3·14) and Bombay (2·50). Small-pox was more widespread than in 1905 and the death rates were upwards of ·5 per thousand in seven provinces, the highest being 1·42 in Lower Burma, 1·30 in Coorg, ·83 in the Central Provinces and Berar and ·8 in Madras. Plague was much less prevalent than in 1905, and although no province except Coorg, escaped altogether, the death rates in Eastern Bengal and Assam (·092), Madras (·02), and the North-West Frontier Province (·02) were low, and the rates in the Punjab (4·56), Bombay (2·79), the United Provinces (1·46) and Ajmer-Merwara (·14) were much lower than in 1905. In Upper Burma, however, the plague death rate rose from ·22 to 1·17. The fever death rates were considerably higher than in the previous year in all provinces except Bengal and Eastern Bengal and Assam, and the death rates from dysentery and diarrhœa were nearly everywhere greater. Respiratory diseases continue to be very badly registered and the only rates over 1 per 1,000 were 3·28 in Bombay, 2·48 in the Punjab and 1·40 in the Central Provinces and Berar, in all of which plague was severe.

Bengal.—The first three months of the year were unusually wet and cold, the rainfall in February being extraordinarily heavy and continuous. In April and May the rainfall was less than usual. The south-west monsoon was established about the middle of June, but the rainfall was irregularly distributed and except in Bihar was in defect. In consequence of this irregularity, agricultural produce was below normal in most of the districts, and even in districts such as Gaya and Bhagulpur, where the harvests were fairly good, the supply of food grains was depleted on account of the demand in Eastern Bengal, where there was great scarcity. These conditions following the bad harvests of recent years raised the prices of food, and during the last six months of the year in many places prices were nearly twice as high as usual.

There was a considerable decrease in the number of births recorded as compared with 1905, the total falling from 1,973,301 in that year to 1,885,725, and the birth rate fell from 39·59 per thousand, the mean of the previous five years, and 39·55 in 1905 to 37·32 in 1906. The birth rate was over 45 per thousand in five districts, namely, Palamau 55·06, Hazaribagh 48·95, Gaya 47·15, Ranchi 46·27, and Sambalpur 45·05; and it was under 30 per thousand in three, namely, Burdwan 29·61, Hooghly 28·93 and Calcutta 17·79. In four towns, Sahibganj (61·92), Katihar (60·37), Jamalpur (59·34) and Kurseong the birth rates were over 50 per thousand; at the other end of the scale was South Barrackpore with a rate of 4·50. In many of the towns exceptionally low birth rates are due to the small numbers of females among the populations. The mean percentage of male to female births was 105, the percentages in the districts ranging from 111 in Howrah to 100 in Manbhum.

The number of deaths recorded during the year was 1,823,243, or 99,126 fewer than in 1905, and the death rate was 36·08 per thousand compared with 38·53 in 1905 and a mean of 34·15 in the previous five years, the fall in the death rate of 1906 being due to a decline in the mortality from plague and the diseases grouped under the heading "fevers." In the districts, the highest death rates were 47·51 in Patna, where plague (9·15) was severe; 47·48 in Purnea, where the death rates from fever (35·97) and cholera (9·37) were very high, and 43·04 in Bhagalpur where also the mortality from cholera (8·23) and fever (28·92) was excessive. In rural areas the mean death rate was 36·15 compared with 35·03 in the towns in which the rates ranged from 74·13 in Monghyr to 7·97 in Ulubaria.

Among Hindus and Muhammadans the death rates were, respectively, 36·63 and 36·13 per thousand, among Buddhists and "other classes" 32·56 and 30·92, and among Christians 23·38.

Male and female infants died at the rates of 214·1 and 198·1 per thousand born, respectively; and boys and girls over one year and under five years of age died at the rates of 58·12 and 51·25 per thousand of the census population. Although the male and female death rates approached each other closely in the age periods 15-20 and 20-30,

the male rates were the higher in every age period, the general male death rate being 37·91 and the female 34·28.

Registration by a professional agency.—The experiment of employing a professional agency in a selected area to ascertain the actual causes of the deaths registered, referred to on page 82 of the abstract for 1905-06 was begun in the Galsi *thana* of the Burdwan District in Bengal. The enquiry is being conducted by an Assistant Surgeon assisted by two Hospital Assistants and will be continued for two years. The population of the area according to the results of a census taken at the commencement of the enquiry is 52,948. The enquiry began on the 1st of August 1906, and during the year ending on the 31st of July 1907, the causes of 2,311 deaths were investigated. The following statement shows the results obtained:—

	Cholera.	Small-pox.	Plague.	Fever.	Dysentery and Diarrhœa.	Respiratory Diseases.	Injuries.	All other causes.	Total.
Number of deaths recorded in the *thana* register.	128	20	...	1,726	88	35	1	313	2,311
Number of deaths according to the results of the investigation.	153	26	...	975	446	488	·3	238	2,311
Ratio per thousand according to the returns in the *thana* register.	2·42	·38	...	32·69	1·66	·66	·02	5·91	43·65
Ratio per thousand according to the results of the investigation.	2·55	·49	...	18·41	8·42	9·22	·06	4·49	43·65

Eastern Bengal and Assam.—The rainfall of 1906 was approximately normal in amount and was fairly evenly distributed; but the great rivers of the delta which drain the Himalayas in the north rose to unusual heights and many districts suffered from floods. The high prices of grain ruling in the end of 1905 in certain districts spread throughout the province; these high prices are ascribed rather to the effect of floods injuring the growing rice crop or delaying the importation of grain and to excessive exports, than to unfavourable meteorological conditions. Relief works were opened and assistance was freely given, while arrangements were made for the speedy reporting of mortuary statistics from the districts most affected so that the occurrence of unusual mortality could be ascertained without delay. It seems that the classes unconnected with agriculture, small traders and people living in towns on small fixed incomes suffered most and that the effects of scarcity are hardly discernible in the vital statistics of the year except possibly in the lowered birth rates of some districts.

The number of births recorded was 1,114,526, and the birth rate 37·38 per thousand, compared with 39·37 in 1905 and a quinquennial mean of 39·63. The highest district rates were 45·94 in Goalpara, 44·51 in Noakhali and 44·34 in Malda; the lowest 33·52 in Sibsagar, 33·14 in Lakhimpur and 32·55 in Sylhet. In rural areas the mean birth rate was 37·74 per thousand compared with 20·73 in the towns among which rates varied from 48·90 in Barpeta to ·95 in Jhalakati. These two towns, the provincial Sanitary Commissioner remarks, may be taken as types of opposite social conditions. Barpeta is a residential town where the female population at child-bearing ages is in slight excess of the male population at corresponding ages; there is little immigration or emigration and the number of foreigners is small. The birth rate per thousand of married women at child-bearing ages is 307 per thousand. Jhalakati, like most of the riverine towns in Eastern Bengal, is a centre of trade and few of the traders have their wives with them. The proportion of males to females is as ten to one, the birth rate among the married women is 46·11 per thousand, and the birth rate per thousand women at the child-bearing age is only 5·78 per thousand.

The mean percentage of male to female births throughout the province was 107, the extremes in the districts being 120 in Bogra and 102 in Lakhimpur.

The number of deaths registered was 944,335 equal to a death rate of 31·67 per thousand which is 3·39 less than the rate of 1905 and almost exactly the same as the quinquennial mean. The highest district death rates were 48·88 in Goalpara, where 35·80 per thousand deaths were ascribed to fever and 6·45 to cholera, 47·84 in Darrang, where the cholera death rate was 16·76 per thousand, and 44·84 in Dinajpur, where all but 3·62 per thousand of the deaths were recorded under the heading 'fever.' The lowest rates were 25·60, 25·53 and 23·22 registered, respectively, in Mymensingh, Pabna and Sylhet. In rural areas the mean death rate was 31·83 compared with 24·15 in the towns, among which the highest rates were 85·79, registered in Mangaldai, a village in which more than

half the deaths were due to cholera ; 56·21 in Barpeta, where a death rate of 33·09 was due to the occurrence of small-pox among a community that have religious objections to vaccination ; and 47·94 in the small town of Jorhat, where besides an exceptionally high death rate under the heading "all other causes," cholera and bowel complaints gave rise to death rates of 5·51 and 5·86 per mille, respectively. The lowest rates were 10·90 in Pabna, 7·39 in Sirajganj and 5·73 in Jhalakati.

The highest death rate was 49·69 among 'other classes.' Hindus came next with 32·36, then Muhammadans 30·65, then Christians 23·91 and lastly Buddhists, 23·12; the vast majority of the Buddhists in the province live in the Chittagong district where the recorded death rate among them was only 1·6.

Male infants died at the rate of 205·9 and female infants at the rate of 187·7 per thousand born, respectively ; and boys and girls over one year and under five years of age at the rates of 45·68 and 38·76. At all age periods, except the three between 15 and 40, the male death rates were the higher, the general rates being 32·59 and 30·71 among males and females, respectively.

Tea gardens.—The mean annual strength of the coolies employed on tea gardens in Assam during the twelve months ending the 30th June 1907 was 680,772, showing an increase in the 12 months of 9,809. Of the total labour force 38·75 per cent. was employed in the Surma Valley and 61·25 per cent. in the Assam Valley, the distribution approximating closely to that of the preceding year. The birth rate showed a decrease, being 28·3 per thousand of the total population and 91·8 per thousand of the adult female population against 29·2 and 94·7 per thousand, respectively, in 1905-06. These rates compare unfavourably with the corresponding provincial ratios of 37·38 and 122·7.

The registered death rate was 22·0 per mille compared with 24·6 in the preceding year, the total number of deaths being 15,007. The principal causes of deaths were dysentery (2,769), malarial fever (2,204), diseases of the respiratory organs (1,805), anchylostomiasis (1,668) diarrhœa (1,628), and cholera (1,164).

The death rate among coolies from all recruiting areas except Madras showed a slight decrease. The mortality among coolies from that province increased from 26·64 to 30·88.

The number of unhealthy gardens, *i.e.*, those with a death rate of over 70 per mille, was 8 out of a total of 748, against 10 out of a total of 757 in the previous year.

There were 98 deaths among coolies travelling to the Assam Valley, against 58 in the previous year; 73 of these deaths were due to cholera. No deaths were reported among coolies in transit to the Surma Valley or at the Sylhet depots.

United Provinces.—The number of births registered was 1,918,425, or 48,584 fewer than in 1905 and the birth rate, which averaged 44·25 per thousand in the previous five years and was 41·24 in 1905, fell to 40·22. Among the district birth rates the highest were 54·42 in Bijnor, 53·62 in Pilibhit and 53·33 in Shahjahanpur ; in other five districts, comprising the remaining districts of the Rohilkhand division and Hardoi and Kheri, the rates were over 50 per mille, and in other six they were over 45, while in only two districts, Dehra Dun 28·13, and Ballia 27·74, were they below 30. In the 89 municipal towns the mean birth rate was 39·30, and in only 31 of them were the birth rates higher than the death rates.

The mean percentage of male to female births was 108·72; in three districts, Dehra Dun 124·29, Banda 115·31 and Ballia 113·03, the percentages were exceptionally high, elsewhere they ranged from 112·46 in Muttra to 103·06 in Almora.

The number of deaths recorded fell from 2,098,300 in 1905 to 1,863,336 in 1906, and the death rate from 44·00 per mille to 39·07, compared with the quinquennial mean of 36·36. The decline of 4·93 per thousand in the death rate as compared with 1905 was almost entirely due to the lessened prevalence of plague from which the death rate fell from 8·05 to 1·46; cholera and fevers were much more prevalent than usual.

Among the districts the highest death rates were 80·75 in Jalaun, 73·34 in Jhansi, and 65·21 in Hamirpur, adjoining districts in the south of the province in which cholera and fevers were exceptionally severe. In three districts Partabgarh 29·98, Almora 28·40, and Dehra Dun 26·63, the death rates were under 30 per mille.

In rural areas the mean death rate was 38·31 compared with 49·15 in the towns, in which the rates ranged from 111·95 in Nagina and 88·20 in Najibabad to 24·78 in Sardhana.

Hindus and Muhammadans died at the rates of 39·33 and 38·52 per thousand, respectively, and 'other classes' and Christians at the rates of 13·77 and 11·41.

Male infants died at the rate of 249·7, and female infants at the rate of 252·8 per thousand born, respectively; and boys and girls between one year and five years of age

died at the rates of 78·16 and 78·40 per thousand of the census populations at those ages. In the four age periods between 10 and 40 years the female death rates were the higher, in all other age periods the male death rates were the higher, the general rates being 38·72 per thousand among males and 39·44 among females.

Punjab.—During the first quarter of the year the temperature was lower than usual, and in February and March the rainfall was exceptionally heavy. April and May were hotter and drier than usual, and in June, although the rainfall in the hills was very abundant, precipitation on the plains was below normal. The monsoon rains on the plains were scanty in July, which was abnormally hot, but were copious thereafter. The weather of the last three months of the year was dry and warm. The prices of food grains which, on account of the demand from other provinces, were high in the beginning of the year, fell when the prospects of the spring harvest were assured, and reached normal rates towards the end of the year.

The number of births registered in 1906 was 878,006, compared with 893,360 in the previous year, and the birth rate fell from 44·4 per thousand to 43·7 which is, however, 2·1 per thousand higher than the quinquennial mean. The highest district birth rates were 53·7 per mille in Lyallpur—Chenab Colony, 49·8 in Multan and 48·2 in Sialkot, and the lowest 34·7 in Rohtak, where there was scarcity in the end of 1905 and beginning of 1906, 33·9 in Dera Ghazi Khan and 20·0 in Simla. In rural areas the mean birth rate was 43·9 against 40·0 in the towns. The mean percentage of male to female births was 109·7, the percentages, omitting the exceptional percentage of 121·9 in Dera Ghazi Khan, ranging in the districts from 115·7 in Mianwali to 104·3 in Simla.

The recorded deaths numbered 742,906, no less than 213,202 fewer than in the previous year, the reduction in the number being due to the diminished prevalence of plague from which the recorded number of deaths fell from 390,233 in 1905 to 104,863 in 1906. The death rate from all causes was 36·9 per mille, compared with 47·6 in the previous year and 45·2, the mean of the previous five years. Among the districts the death rate varied between 49·7 per thousand in Sialkot and 24·2 in Simla. The mean rural death rate was 36·08, compared with 44·73 in the towns among which rates ranged from 89·23 in Zira, a small plague-stricken town in the Ferozepore district, 81·91 in Bhiwani where the death rate from plague was 36·42, and 79·43 in Sangla, a small town in Gujranwala where plague was present and the death rates recorded under the heading fevers and all other causes were exceptionally high, to 9·6 in Khangah Dogran in Gujranwala.

Hindus and Muhammadans died at the rates of 37·51 and 36·42 per thousand, respectively, and other classes and Christians at the rates of 77·19 and 30·57.

Calculated upon the births registered during the year the death rates of infants were 230·2 and 240·1 per thousand among males and females, respectively. Boys and girls between the ages of one year and five years died at the rates of 70·23 and 76·94, respectively; and at all other age periods the female death rates were the higher—the general death rate among males being 34·7 and among females 39·5.

North-West Frontier Province.—The number of births registered rose from 70,369 in 1905 to 76,834 and the birth rate from a mean of 33·2 per thousand in the five years ending 1905, and 35·4 in that year, to 38·6 which is the highest rate hitherto recorded. Allowance being made for the increase in the population since the date of the census, it appears that the rise in the birth rate is largely due to improved registration. The special measures for the check of registration carried out during the last three years were continued and show that although the proportion of male to female births is very high, it is possibly exaggerated by defective registration. In the districts the birth rates ranged from 46·1 in Kohat to 36·2 in Dera Ismail Khan, and the percentages of male to female births from 129·7 in Peshawar to 108·8 in Hazara, the provincial mean being 118·8.

The deaths registered numbered 67,149 or 13,822 more than in 1905, and the death rate was 33·7 per thousand compared with 26·8 in 1905 and a quinquennial mean of 25·6. The autumn was very unhealthy, the monthly death rates reaching 5·16 and 5·80 per mille in November and December respectively. In the districts the death rates ranged from 44·2 in Dera Ismail Khan to 31·9 in Peshawar and in Hazara. In rural areas the mean death rate was 33·50, compared with 36·28 in the towns, among which exceptionally high rates were recorded in Buffa, 52·21, of which 36·14 were attributed to fevers, in Haripur, 50·91, of which 9·14 were registered as due to respiratory diseases, and in Lakki, 47·14.

The Muhammadan death rate was 34·35 compared with a rate of 27·84 among the Hindus who number about one-fifteenth of the population.

Male infants died at the rate of 224·5 per thousand born during the year and female infants at the rate of 224·7 ; and boys and girls between the ages of one year and five years died at the rates of 67·02 and 72·82 per thousand of the census populations at those ages. At all age periods the female death rates were higher than the male death rates, the general rates of the sexes being 31·7 among males and 36·0 among females.

Central Provinces and Berar.—The drought in the last quarter of 1905 followed by heavy showers and hail in February caused some damage to the *rabi* crops ; but the monsoon broke early in June and the abundant well distributed rainfall ensured a good supply of food grains. The heavy rainfall, however, was followed by an unhealthy autumn, and mortality was high in August, September and October.

The number of births registered was 614,616, and the birth rate was 51·72 per thousand, compared with 54·02 in 1905 and a five years average of 45·83. In three districts the rates were 60 per cent. or over, namely, Betul 62·78, Nimar 60·46 and Chhindwara 60·0, and in only one district, Jubbulpore, 44·91, was the rate below 45. In rural areas the mean birth rate was 52·94 compared with 41·13 in the towns, the rural rate being the higher in every district except Amraoti. The provincial percentage of male to female births was 104·52, the extremes being 109·58 in Burhanpur and 102·66 in the newly formed district of Drug.

The registered deaths totalled 516,613, and the death rate was 43·47 per thousand compared with 37·21 in the previous year and 31·33, the quinquennial mean. In the districts the death rates ranged from 64·38 in Yeotmal to 30·0 in Raipur, the mean death rate in rural areas being 42·71 compared with 50·01 in the towns. Among the latter the enormous death rate of 220·59 per thousand was registered in a small town in the Nagpur district called Kalmeshwar, where more than 12 per cent. of the inhabitants died of plague and more than one per cent. from cholera. The two next highest urban death rates were registered in the same district, in Saoner 133·13 and Kamptee 95·55, in both of which plague was very severe.

The death rate of male infants was 292·16 and of female infants 266·35 per thousand born, respectively. The general death rate among males was 55·58 per thousand compared with 41·41 per thousand among females.

Madras.—The number of births registered was 1,125,978 or 50,278 fewer than in 1905, and the birth rate of 1906 was 30·9 per thousand compared with 32·0 in 1905 and 29·4, the quinquennial mean. Among the districts the rates ranged from 37·6 in South Canara to 20·4 in Nellore ; the rates in 16 of the districts being lower than in the previous year, a result which is ascribed to the continued high price of food grains. In rural areas the mean birth rate was 30·7 or 1·7 per thousand less than the mean of the populations of the towns, among which by far the highest birth rate was 61·7 in Vaniyambadi, the rates elsewhere varying between 50·5 in Dindigul and 4·1 in Rajempet.

The percentage of male to female births was 104·4, the percentages in the different districts varying between 106·5 in Ganjam and 101·3 in Kurnool.

The registered deaths numbered 998,391 or 212,268 more than in 1905, and the death rate which averaged 21·5 per mille in the previous five years and was 21·4 in 1905 rose to 27·4. Cholera, small-pox, fevers, dysentery and diarrhœa and respiratory diseases were all more prevalent than usual. Among the district death rates, the highest was 46·9 recorded in Madras, where dysentery and diarrhœa were specially rife and the death rate under the heading 'all other causes' was nearly double the presidential mean; elsewhere the rates ranged from 34·3 in the Nilgiris to 22·0 in Nellore. The mean rural death rate was 26·6 per thousand compared with 33·4 in the towns, among which the highest death rate was 77·5 recorded in Suluru, a town in Vizagapatam in which the death rate from cholera was 50·2 per thousand. The death rates in the other towns ranged from 56·9 in Narasannapeta to 6·1 in Gobichettipalayam.

Among Muhammadans and Hindus the death rates were, respectively, 28·1 and 27·5 per thousand, and among Christians and 'other classes,' 23·6 and 16·2.

Male and female infants died at the rates of 200·0 and 182·1 per thousand born, respectively, and boys and girls between one year of age and five at the rates of 38·8 and 36·7 calculated on the census population. At all age periods except 15-20 and 20-30 the male death rates were the higher, the rates for the sexes being 28·2 among males and 26·5 among females.

Coorg.—The number of births registered was 4,713 and the birth rate was 26·10 per thousand compared with 25·31 in 1905 and 23·31, the quinquennial mean. The rates ranged from 39·97 in Padinalknad to 20·37 in Mercara, the percentage of male to female births being 107·47 in Mercara and varying elsewhere between 98·27 in Kiggatnad and 94·24 in Padinalknad.

The registered deaths numbered 5,285 and the death rate which had fallen from a quinquennial mean of 29·57 per thousand to 26·24 in 1905 rose to 29·26, the district rates ranging from 33·36 in Nanjarajpatna to 23·69 in the Kiggatnad, the mean in rural areas being 28·59 against 36·59 in the towns.

Male and female infants died at the rates of 247·0 and 232·7 per thousand born, respectively. The male were higher than the female death rates in all age periods except 5-10, 15-20, 20-30 and 30-40, the rates of the sexes being 28·68 and 29·99 per thousand among males and females, respectively.

Bombay.—The scanty rainfall and the consequent failure of crops resulted in high prices of food grains amounting to scarcity in certain of the Deccan districts, but fortunately the rains of 1906 were abundant and well distributed, so that prices fell although they continued at a higher level than normal until the end of the year.

The number of births registered was 625,486, and the birth rate was 33·84 per thousand, compared with 33·07 in 1905 and a quinquennial mean of 31·75. By far the highest district birth rate was 52·47 per thousand recorded in Khandesh; in the other districts of Bombay proper the rates ranged from 46·72 in Nasik to 30·0 in Ratnagiri. In the urban district of Bombay the birth rate was 26·96, and in the districts of Sind the rates ranged from 24·67 in Sukkur to 16·63 in Hyderabad. The mean percentage of male to female births throughout the presidency was 107·60; but while in the Bombay districts the highest percentage was 112·0 in Kaira and the lowest 101·79 in Kanara, in the Sind districts the lowest percentage was 114·71 in Karachi and the highest 137·43 in Hyderabad.

The recorded deaths numbered 648,019 compared with 588,394, and the death rate was 35·06 per thousand as compared with 31·84 in 1905 and a mean of 38·66 in the five years ending with 1905. There was a further decline of 1·07 per mille in the plague death rate, but cholera, fevers and bowel complaints were more prevalent than usual. Among the districts the highest death rate was 68·98 in Bombay City where plague was again epidemic and caused a death rate of 14·20 per thousand. In the Poona district the death rate was 50·84, including high rates from plague, cholera and bowel complaints; the next highest rates were 43·04 in Ahmedabad and 40·71 in Nasik, in the former the fever death rate was very high and in the latter the death rates from cholera and from 'all other causes' were exceptionally high. The lowest district death rates were 23·67 in Thar and Parkar, 21·56 in Hyderabad and 21·39 in Ratnagiri. In rural areas the mean mortality was 32·25 compared with a mean of 53·76 in the towns, in which, excluding the exceptional death rate of 103·56 in Poona, where plague caused 7,319 deaths equal to a rate of 60·72 per thousand, the rates ranged from 75·77 in Viramgam to 12·29 in Ahmednagar Cantonment and 8·75 in Ahmedabad Cantonment.

Among the sects Christians had the lowest death rate, 24·96 per thousand, and 'other classes' the highest, 78·51; the other rates being Hindus, 36·64, Muhammadans, 29·26, Parsis, 27·29 and Jains, 26·15.

Male infants died at the rate of 226·0 and female infants at the rate of 214·17 per thousand born, respectively; and boys and girls between the ages of one and five years died at the rates of 63·53 and 62·10, respectively. The male death rates were the higher in all age periods except 5-10, 10-15, 15-20, and 20-30, the general rates being 35·26 among males and 34·85 among females.

Lower Burma.—The prices of food grains were higher than usual, partly on account of damage by rain to the crops after reaping, but mainly on account of large exports to India; there is, however, no evidence that the high prices exercised any influence on the vital statistics.

The number of births registered was 180,025 and the birth rate was 32·33 per thousand, considerably lower than the rate registered in the previous year, 34·34, and slightly lower than the quinquennial mean. In only three districts, Mergui, 43·45, Sandoway, 42·67, and Tavoy, 41·91 were the birth rates over 40 per thousand, and in five, Kyaukpyu 29·88, Maubin 28·35, Amherst 28·17, Akyab 26·46, and Rangoon 17·16 they were below 30. The mean birth rate in rural areas was 33·28, compared with 25·80 in the towns, but the mean urban birth rate is reduced by the very low rates prevailing in Rangoon, Moulmein and Akyab, where there are large floating coolie populations; excluding those towns, the urban birth-rate was 33·52. The percentage of male to female births was 107, the percentage varying greatly in the different districts—in Myaungmya where 8,523 births were registered, it was 120, and in the neighbouring district of Henzada where the births recorded aggregated 16,520, it was 99; in the Arakan districts the percentages were 113 in Sandoway and 111 in Akyab and in Kyaukpyu.

The number of deaths recorded was 151,193 and the death rate was 27·15 compared with 24·93 in 1905 and a quinquennial mean of 22·83, the increase in mortality being shared by all the registered causes of death. The highest death rate was 47·57 in the Rangoon town district, in the other districts the rate ranged from 40·35 in Thayetmyo to 17·43 in Tavoy. In rural areas the mean death rate was 24·89 compared with 42·59 in the towns in which the rates varied between 65·34 in Myanaung which suffered severely from plague and cholera, and 17·22 in Sandoway.

The death rate among Hindus was 35·37 per thousand, their high rate being due to exceptional mortality among them in Myaungmya, Rangoon and Prome; among the Burmese the death rate was 26·88, among Muhammadans 25·59, among Christians 19·14 and among 'other classes' 32·64.

Male infants died at the rate of 236·5 and female infants at the rate of 188·7 per thousand born, respectively; and boys and girls between one year and five years of age died at the rates of 34·25 and 30·62 per thousand of the census populations at those ages. In all age periods the recorded male death rates were higher than the female death rates—owing probably to the large number of male coolie immigrants in the population. The mean male death rate was 28·63, the female rate 25·45.

Upper Burma.—The registration of births is still limited to certain towns—thirteen in 1906, in which the birth rates ranged from 39·22 in Taungdwingyi to 28·58 in Meiktila, and the percentages of male to female births from 128 in Salin and Yamethin to 88 in Monywa.

Death registration is general, and the number of deaths recorded in 1906 was 76,493 equal to a death rate of 26·22 per thousand compared with 22·46 in 1905, and 19·84, the five years' mean. In the districts the rates varied between 43·59 in Mandalay and 18·35 in Sagaing, the mean in rural areas being 23·41 and in towns 50·42. At all age periods except 20-30 and 30-40, the male death rates were the higher, the mean death rates being 27·68 among males and among females 24·91 per thousand.

Ajmer-Merwara.—The registered births numbered 13,789 against 17,802 in 1905, and the mean birth rate which was 30·51 per thousand in the five years ending 1905 and was 37·32 in that year, fell to 28·91 in 1906, the rates having been 33·65 in Merwara and 27·50 in Ajmer.

The deaths recorded aggregated 15,367 and the death rate was 32·22 or 2·03 per thousand less than in 1905 and ·91 more than the quinquennial mean. The registered death rate in Ajmer was 33·74 and in Merwara 27·11. In rural areas the mean was 27·75 compared with 44·21 in the towns among which the rates ranged from 70·94 per thousand in Ajmer suburb to 31·65 in Nasirabad.

The death rates among infants were 317·5 and 317·9 per thousand born among males and females, respectively. Boys and girls over one year of age and under five died at the rates of 135·82 and 145·70 per thousand of the census populations at those ages. In the age period 5-10 the male death rate was slightly higher than the female, and in the age periods over 40 the male rates were considerably greater, but at all other age periods females died at a greater rate than males, the general rates among the sexes being 31·38 and 33·16 among males and females, respectively.

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History of the Chief Diseases.

(For Statistical Tables, *see* pages 132—136.)

The table below shows at a glance the number of deaths, and the death rates per 1,000 of population recorded in British territory in India during each of the five years from 1902 to 1906.

Years.	Cholera.	Small-pox.	Fevers.	Dysentery and Diarrhœa.	Plague.	All causes.
1902 ...	224,136	115,443	4,279,351	235,750	456,975	7,112,336
	·99	·51	18·95	1·04	2·02	31·49
1903 ...	312,854	93,693	4,459,237	273,459	686,485	7,881,125
	1·38	·41	19·66	1·21	3·03	34·7
1904 ...	192,835	55,232	4,093,981	240,655	940,609	7,436,472
	·85	·24	18·09	1·06	4·16	32·86
1905 ...	441,786	70,962	4,417,655	264,124	940,821	8,117,771
	1·96	·31	19·57	1·17	4·17	35·96
1906 ...	690,519	109,583	4,452,842	298,117	300,355	7,852,330
	3·05	0·48	19·69	1·32	1·33	34·73

On comparing the figures for the year under review with those for the previous year it will be seen that in 1906 there was a considerable increase in the number of deaths attributed to cholera, small-pox, fevers, and dysentery and diarrhœa, but that the number of deaths recorded as due to plague was only about one-third of the number recorded in 1905, and that from all causes taken together there were recorded in British territory 265,441 fewer deaths than in 1905.

Cholera in India in 1906.—The number of deaths from cholera recorded in British territory during 1906 was 690,519, equal to a death rate of 3·05 per 1,000 of the total population under registration. If the deaths recorded in the Native States from which returns were received are added (Table XXV), the total amounts to 713,664. In the previous year 441,786 deaths from cholera were recorded in British territory, giving a ratio of 1·96 per 1,000 of population, so that during the year under review cholera was more than one and a half times as prevalent as in the previous year. This increase in mortality during 1906 was shared by all the British provinces except Eastern Bengal and Assam and the North-West Frontier Province. The greatest numbers of deaths from the disease during the year were recorded in Bengal, the United Provinces, the Madras Presidency, and Eastern Bengal and Assam. In Eastern Bengal and Assam 34,034 fewer deaths from this disease were recorded than in 1905, but in the Central Provinces 38,768 deaths were reported as compared with 1,217 in 1905, in Madras 142,811 as compared with 16,888, and in Bombay 46,119 as compared with 5,396. The highest death rates were recorded in Madras, Bengal, Eastern Bengal and Assam, the Central Provinces and Berar and the United Provinces, and in all provinces except the Punjab and Bombay, cholera was prevalent throughout the year. As usual the seasonal prevalence of the disease did not correspond in the different provinces: in Bengal and Bombay the greatest number of deaths occurred in April, in Eastern Bengal and Assam in January, in the United Provinces in May, and in the Punjab, the Central Provinces, Madras and Upper Burma in August; and fewest deaths occurred in February in Bengal, in September in Eastern Bengal and Assam, in January in the United Provinces and the Central Provinces, and in March in Madras.

Recent investigations.—In the issues of this report for 1904 and 1905 brief summaries were given of the important researches carried out in Egypt and elsewhere with reference to certain vibrios isolated from the intestinal contents of pilgrims to Mecca who had died from diseases other than cholera. Investigation and discussion have been concerned chiefly with the problem whether these vibrios—now generally known as the "Tor vibrios"—are or are not true cholera vibrios. Bacteriologists are not in agreement as to the correct answer to this question. It will be remembered that Gotschlich, who was the first to work systematically at the subject came to the conclusion, from a consideration of their morphological, cultural, and biological characters, as well as for epidemiological reasons, that the Tor vibrios are true cholera vibrios; and Kolle and Meinicke as well as Mühlens and von Raven arrived at the same view. On the other hand Kraus and his co-workers reported that the Tor vibrios possess certain hæmolytic and toxin-forming properties which, it was said, are not possessed by the true cholera vibrios, and they concluded for this reason that the Tor vibrios must be regarded as distinct from the true cholera vibrio and must be placed in a special group. Gaffky, Pfeiffer,

Gotschlich and others did not agree with the view of Kraus. Subsequently Dr. M. A. Ruffer in a review of the researches into the bacteriological diagnosis of cholera carried out by medical officers of the sanitary, maritime and quarantine council of Egypt, advocated the correctness of Kraus's conclusions and stated definitely his opinion that the Tor vibrios are not true cholera vibrios. More recently Neufeld and Haendel have investigated the hæmolytic and toxin-forming properties of the Tor vibrios and of true cholera vibrios and have come to a conclusion entirely different from that of Ruffer; they consider that the Tor vibrios are true cholera vibrios. It is unfortunate that the different workers are not of one opinion about this matter because on the one hand, if the Tor vibrios are not true cholera vibrios it must be concluded that the bacteriological methods hitherto employed for the diagnosis of the cholera vibrio are not adequate for the purpose, and on the other hand, if the Tor vibrios are true cholera vibrios it must be concluded not only that under certain conditions the cause of cholera, like that of typhoid fever, can remain in apparently healthy human beings much longer than has been thought possible hitherto, but that "cholera bacilli carriers" are not necessarily dangerous to the community.

Cholera in Bengal.—In Bengal in 1906 the total number of deaths recorded as due to cholera was 192,596 or 3·81 per mille of the population, as compared with 146,339 or 2·93 per mille in 1905 and 116,490 or 2·33 per mille, the average figures for the five years 1901-05. Excepting the year 1900, the mortality from cholera during 1906 was the highest ever recorded, and no district entirely escaped. The disease assumed an epidemic form in 123 registering circles against 104 in 1905 and caused a death or deaths in 21,365 villages (excluding those in Sambalpur) as compared with 18,652 in that year. The highest mortality was recorded in the district of Purnea where 17,579 of the inhabitants (equal to a ratio of 9·37 per mille of the population) died from this cause; next in order came Bhagalpur with 17,190 deaths (8·23 per mille), Champarun with 12,328 (6·88 per mille), Khulna with 7,867 (6·27 per mille), Balasore with 5,627 (5·25 per mille), Cuttack with 10,789 (5·22 per mille), Gya with 10,069 (4·88 per mille), Midnapore with 13,406 (4·80 per mille), Birbhum with 4,207 (4·66 per mille) and Howrah with 3,959 (4·65 per mille). Ranchi continued to be almost free from the disease and its comparative immunity is attributed to the population being scattered over a large area and to the good natural drainage existing in most parts of the district; also in the districts of Singhbhum, Palamau, and Darjeeling the mortality from cholera was low.

Disinfection of wells with permanganate of potash was carried out in about 16 districts where cholera prevailed, but in some districts the inhabitants were opposed to the measure and it was carried out with difficulty. It is said also that in Purnea the people refused to drink the water of wells which had been treated, so that in this place disinfection had to be stopped. It appears that some villages where the measure was thoroughly carried out were completely free from cholera, although the disease was prevalent in neighbouring districts.

The highest death rates from cholera recorded in towns were 14·39 per mille in Meherpur in the Nadia district, 14·02 in Sitamarhi in the Muzaffarpur district, 12·65 in Hazaribagh, 12·46 in Baduria, in the 24-Parganas, and 12·40 in Nadia. In rural areas the highest death rate, 37·46 per mille, was recorded in Raniganj.

Among the European seamen of the port of Calcutta there were three deaths from cholera; and there were 48 among the native floating population.

Cholera in Eastern Bengal and Assam.—The number of deaths attributed to cholera in Eastern Bengal and Assam during 1906 was 108,278, equal to a ratio of 9·63 per thousand of the census population, as compared with 142,312 deaths or a ratio of 4·77 per mille in 1905. January was the month of greatest prevalence, as a result of the continuance of the epidemic of the previous year, and in most districts the prevalence diminished considerably as soon as the rainy season began. The highest death rates were recorded in the Kamrup and Darrang districts, namely, 21·15 and 16·76 per mille of population, respectively. The provincial Sanitary Commissioner reports that there is a great scarcity of drinking water in some parts of the Kamrup district and that in more than 50 villages which the Civil Surgeon visited the immediate cause of the outbreak was found to be the drinking of contaminated water. The Civil Surgeon of this district reports that the people are beginning to realise the necessity of having good water for drinking purposes and that applications for grants-in-aid to improve existing water-supplies and to sink new wells are numerous.

In towns the highest death rates were recorded in Mangaldai (43·60 per mille), Dhubri (19·79 per mille), and Pirojpur (9·91 per mille). A sum of Rs. 300 was allotted by the

Sanitary Board to aid in improving the water-supply of Mangaldai and a new well is being constructed there by the Public Works Department. The epidemic in Dhubri was said to be due to the fact that the people who live on the banks of the Brahmaputra river obtain their drinking water from a part of the river where, as it is shut off from the main stream by a sand bank, there is no current; this part of the river is used as a harbour for trading boats and is much contaminated with fæces. The provincial Sanitary Commissioner does not think it desirable to sink wells in this place as the town is threatened with destruction by the river, but recommends that a temporary bridge should be erected across the area of slack water, so that water for drinking purposes may be obtained from the main stream.

Permanganate of potash was largely used for the disinfection of water-supplies where cholera prevailed and almost all Civil Surgeons considered the measure to be of great value.

The death rate from cholera among the tea-garden population in the Assam and Surma Valleys was 2·35 per mille as compared with 2·14 per mille in 1905.

Cholera in the United Provinces.—The total number of deaths from cholera recorded in the United Provinces during 1906 was 149,549, equal to a ratio of 3·14 per 1,000 of population, as compared with a total of 121,799 and a ratio of 2·55 in 1905. The average death rate of the preceding quinquennium was 1·07 per mille. The greatest number of deaths occurred in May and the smallest number in January. All districts suffered more or less, those with the highest death rates being Jhansi (13·70 per mille), Jalaun (11·50), Gonda (10·58), Kheri (10·24) and Hamirpur (10·02).

The highest death rates for this disease recorded in towns were 19·16 per mille at Mahoba (Hamirpur), 17·69 at Mubarakpur (Azamgarh), 17·16 at Rath (Hamirpur), 13·72 at Konch (Jalaun), 13·47 at Sherkote (Bijnor), and 13·23 at Lalitpur (Jhansi). Of the 106 towns with populations of 10,000 or more, no death from cholera was reported in 26, while in 25 of the remainder the number reported did not exceed ten.

The *Kumbh Magh mela*, which takes place once in 12 years, was held at Allahabad in January and February 1906. Cholera broke out on the 6th January and continued until nearly the end of the *mela*, causing altogether 333 cases with 267 deaths. At the Dikhauti fair at Hurdwar which took place on the 13th April, seven cases of cholera and four of small-pox, all except one being imported, were reported during the week preceding the principal bathing day; but no secondary cases occurred and there was no epidemic of disease. No case of cholera was reported to have occurred at the Dadri fair at Ballia, or at the Garhmuktesar fair which was held in the Meerut district during November.

Cholera in the Punjab.—In the Punjab the total number of deaths recorded as due to cholera was 4,232 (0·21 per 1,000 of the population) against 2,197 (0·11 per 1,000) in the previous year. More than one-third of the total number of deaths reported occurred in the Lahore district and about one-seventh in the Sialkot district. There are altogether 32,834 towns and villages in the province but a death or deaths from cholera were reported to have occurred in only 610, of which 319 are in the districts just mentioned. Rewari (113 deaths) was the only town out of those with a population of 10,000 and upwards in which the disease prevailed in a severe form, and among smaller towns the highest death rates registered were 7·89 and 5·16 per mille in Khem Karan (Lahore district) and Pasrur (Sialkot district), respectively. As usual the province remained practically free from the disease during the first four months of the year, but a rapid increase took place in July and the largest numbers of deaths, 1,537 and 1,225 respectively, were registered in August and September when cholera is generally at its maximum prevalence in the province.

Cholera in the North-West Frontier Province.—In 1906 no case of cholera was reported to have occurred in this province. In the previous year 415 cases and 303 deaths were registered.

Cholera in the Central Provinces and Berar.—In the Central Provinces and Berar the total number of deaths recorded as due to cholera in 1906 was 38,768, or 3·26 per mille of the population, as compared with a total of 1,217 and a ratio of ·10 per mille in 1905. Of the total number in the year under review, 17,247 (equal to a ratio of 1·89 per mille of the population) were recorded in the Central Provinces and 21,521 (7·81 per mille of the population) in Berar. The probability that an epidemic of cholera would occur was anticipated in view of the occurrence in January of the *Kumbh mela* at Allahabad and, as far as possible, precautions to guard against it were taken.

The districts in the Central Provinces where the inhabitants suffered most from cholera were Jubbulpore (3,374 deaths), Nagpur (2,964 deaths), Wardha (2,638 deaths), Bhandara (1,277 deaths), Narsinghpur (1,129 deaths), Saugor (1,119 deaths) and Drug (1,051 deaths).

In Berar the death rate from cholera (7·81 per 1,000 of the population) has only three times been exceeded during the last 35 years. There were recorded as due to this disease 7,791 deaths in the Yeotmal district, 5,277 in the Buldana district, 4,974 in the Akola district and 3,479 in the Amraoti district.

In general the origin of outbreaks in the province was attributed to importation of the disease from Allahabad, Puri, Ujjain, Nasik, and Pandarpur, but it is said that in many instances large tracts of country became simultaneously affected without it being possible to trace infection from outside. Among causes which influenced the unusual prevalence are mentioned the drying up of wells and tanks during the second quarter of the year, and the consequent necessity of drawing water from polluted streams; the gathering together of large numbers of people in connection with the harvest, and, later in the year excessive heat during a break in the rains, followed by unusually heavy rainfall. The vaccination staff as well as Assistant Surgeons and Hospital Assistants specially deputed distributed medicine in affected areas and disinfected the sources of water-supply with permanganate of potash.

Cholera in the Madras Presidency.—In the Madras Presidency in 1906 there were 142,811 deaths recorded as due to cholera, giving a ratio of 3·9 per mille of population, as compared with a total of 16,888 and a ratio of ·5 per mille in 1905. Deaths from cholera were reported in all the districts of the Presidency but the disease was chiefly prevalent in the Kistna, Godavari, Kurnool, Ganjam and Tinnevelly districts, the death rates in them being 8·9, 8·3, 7·6, 6·4, and 6·2 respectively, per mille of population. In the Nilgiris district only 15 deaths were recorded, equal to a death rate of 0·1 per mille. The months of greatest prevalence were August and July, in which no less than 36,496 and 29,968 deaths, respectively, occurred, and the lowest numbers of deaths, 836 and 1,015, were recorded in March and April.

The highest death rates from cholera recorded in towns were 17·5 in Periyakulam, 15·5 in Palni and Nandyal, 12·1 in Ellore, 10·3 in Tinnevelly and 10·1 in Palamcottah; while Kodaikanal, Cannanore and Mangalore were free from the disease.

Permanganate of potash was, as usual, largely employed for the purification of polluted sources of water-supply.

Cholera in the Bombay Presidency.—In the Bombay Presidency there were recorded as due to cholera 46,119 deaths, equal to a ratio of 2·50 per mille of population, as compared with 5,396 deaths or a ratio of ·29 per mille in 1905. The mortality in 1906 has been exceeded twice only during the last twenty years, namely, in 1897 and 1900, both of which were years of famine. Of the 25 districts, all except Kaira were more or less affected, the highest death rates from this disease being recorded in Colaba (7·61 per mille of population), Poona (6·54), Nasik (5·34), and Thana (5·25). No death was reported to have occurred during January, and the highest mortality occurred during April and May when there were recorded 11,047 and 10,862 deaths, respectively.

Deaths from cholera were recorded in 42 of the 56 town circles in the Presidency, as compared with 11 in 1905; the highest rates per mille being 16·93 in Nasik, 12·79 in Wai (Satara), 9·45 in Athni (Belgaum), 8·41 in Ahmednagar, 8·37 in Junnar (Poona) and 8·30 in Pandharpur (Sholapur). In the City of Bombay 1,223 deaths were recorded as compared with 25 in the previous year.

The provincial Sanitary Commissioner reports that the outbreak in the western registration district was traced to the use of water from a pool which is the chief source of water-supply for a large number of the high caste inhabitants of Nasik. The water of this pool is also largely used by pilgrims and the place is regarded as sacred. Arrangements were made to have the infected pool emptied and cleaned out, but it is reported that as soon as the work was begun numbers of priests and Brahmins "drove the workmen away and refused to allow any interference with the sacred spot."

Cholera in Burma.—In Lower Burma during 1906 there were recorded as due to cholera 5,529 deaths, equal to a ratio of ·99 per mille of population, as compared with 3,511 deaths or ·63 per mille from the same cause in 1905. Deaths from cholera were recorded during each month of the year, but the highest number occurred in July and the lowest number in November. The highest death rates per mille of population recorded in districts were 5·91 (1,417 deaths) in Thayetmyo, 2·36 (668 deaths) in Maubin and 2·27 (1,100 deaths) in Henzada; in towns the highest death rates were 20·48 in Zalun, 8·84 in Yandoon, 8·33 in Toungoo, 7·74 in Lamyethna and 7·17 in Danubyu.

In Upper Burma the total number of deaths recorded as due to cholera during 1906 was 2,343, equal to a ratio of ·80 per mille of population, as compared with 1,836 or ·63 per mille from the same cause in 1905. The disease prevailed in every district. The highest number of deaths occurred in August and the lowest in February. In districts the highest death rates per mille of population recorded were 1·96 (686 deaths) in Mandalay, 1·45 (363 deaths) in Meiktila, and 1·43 (4,040 deaths) in Sagaing; in towns the highest death rates were 10·17 in Monywa, 6·80 in Meiktila and 6·22 in Sagaing.

Cholera in Ajmer-Merwara.—In Ajmer-Merwara 284 deaths from cholera were recorded during 1906, giving a ratio of ·60 per mille of population. During the three preceding years no deaths from this disease had been recorded.

Cholera in Coorg.—In Coorg ten deaths from cholera—one in October and nine in December—were reported during the year. This small province had been free from the disease during the four preceding years.

Small-pox.—From the statement on page 72 it will be seen that in British territory in India the death ratio per 1,000 of population from small-pox rose from ·31 in 1905 to ·48 in 1906. The mean ratio for the quinquennial period from 1901-05 was ·38 per mille. The total number of deaths recorded from this disease during 1906 was 199,583 against 70,962 in 1905 and 55,232 in 1904. The death rates during 1906 were higher than in 1905 in all provinces except the Bombay Presidency and Ajmer-Merwara, the increase being greatest in Bengal, the United Provinces, the Punjab, the North-West Frontier Province, Lower Burma and Coorg. The small-pox mortality recorded in towns was twice as high as that in rural areas; and the deaths of children under ten years of age amounted to 68·39 per cent. of the total number of deaths from this cause.

In Bengal the number of deaths from small-pox rose from 7,213 (·14 per mille) in 1905 to 22,206 (·43 per mille) in 1906; the mean death ratio during the quinquennial period ending 1905 was ·49 per mille. With the exception of Champarun, Darbhanga, Muzaffarpur and Singhbhum there was a marked rise during 1906 in the mortality from this cause in every district. Among the districts with the highest mortality, Puri stood first with a death rate of 4·85 per mille of population, followed by Calcutta with 3·42 and Howrah with 1·63 per mille, respectively. A scheme for increasing the number of vaccinators in Puri has received the sanction of the local Government. In towns 4,438 deaths and in rural areas 17,768 deaths from small-pox were registered as compared with only 709 and 6,504, respectively, during the previous year. The Civil Surgeon of Burdwan states that in the rural areas of this district the Muhammadans suffered most, and he attributes this to their religious principles which enjoin them to visit patients of their own class suffering from small-pox and prevent the evacuation of infected houses.

In Eastern Bengal and Assam during 1906, small-pox was responsible for 6,972 deaths, equal to a death rate per mille of ·23 against 4,723 deaths and a ratio of ·15 per mille in 1905. The highest rates per mille of population in districts were reported from Kamrup (3·08), Darrang (1·30), and Goalpara (1·24). In towns the highest death rate (33·09) was recorded in Barpeta, the head-quarters of the Mahaparushiyas, among whom, it is said, small-pox is always prevalent because, on religious grounds, they object to vaccination.

In the United Provinces 13,202 deaths were attributed to small-pox in 1906 as compared with 3,273 in 1905 and 6,998 in 1904, the corresponding rates being ·28, ·07 and ·15 per mille of population. The average rate for the quinquennial period was ·16. Garhwal was the only district which was practically free from this disease during the year, the number of deaths recorded being four. The highest death rate in districts (2·66 per mille) was again recorded in Jhansi, and the next highest in Rai Bareli (2·02) and Jalaun (1·85). No death from small-pox was recorded in 35 of the 106 towns with a population of 10,000 and upwards, while in 50 the number did not exceed ten.

In the Punjab, 13,239 deaths from small-pox, equal to a ratio of 0·66 per mille of population, were registered during the year, as compared with 4,723 deaths and a ratio of 0·23 in 1905, and 0·48, the mean ratio during the preceding quinquennium. A death or deaths were recorded during 1906 in 4,252 of the 32,834 towns and villages in the province. Vaccination is compulsory in 26 towns and the death rate from small-pox in these was 1·25 per mille; in the towns where vaccination is not compulsory it was 1·58 per mille.

In the North-West Frontier Province the number of deaths recorded as due to small-pox rose from 571 (·29 per mille) in 1905 to 1,127 (·57 per mille) in 1906. Of the deaths recorded in 1906 no fewer than 1,071 were of children under ten years of age.

The greatest number of deaths were recorded in December and the fewest in October. In the Peshawar district 969 deaths were recorded, in the Hazara district 71 and in the Kohat and Dera Ismail Khan districts 43 each, while in the Bannu district only one death was recorded. It is noteworthy that in the city of Peshawar—now the only town of any importance in the province where vaccination is not compulsory—the death rate was 4·06 per mille of population, as compared with ·07, ·10, and ·17, in the towns of Dera Ismail Khan, Bannu and Kohat, respectively.

In the Central Provinces and Berar there were 9,889 deaths from small-pox recorded during the year and of these 7,580 were of children under ten years of age. In the previous year 8,364 deaths from small-pox were recorded. In the year under review the disease was, as usual, chiefly prevalent during the hot season. Measles and chicken-pox were also prevalent during the same months and the provincial Sanitary Commissioner states that the reporting agents are apt to confuse the three diseases. The existence of plague is said to have interfered with the work of vaccination during recent years.

In Burma there was an increase in the prevalence of small-pox during the year, the total number of deaths recorded being 8,540 against 6,161 in 1905. Lower Burma was chiefly affected, 7,903 deaths, equal to a death rate of 1·42 per mille of the population, being recorded against 5,623 deaths and a rate of 1·01 in 1905. In Upper Burma the increase was very slight, there having been 637 deaths recorded, equal to a death rate of ·22 per mille of the population, against 538 and a rate of ·18 in 1905. The highest death rates were recorded in the Rangoon, Bassein and Hanthawaddy districts, all in Lower Burma.

In the Madras Presidency the number of deaths recorded as due to small-pox in 1906 was 29,840 (·8 per mille of population) against 18,540 (·5 per mille) in 1905. A death or deaths from the disease were registered in every district and in all except ten of the 61 municipal towns. The death rate in towns was somewhat higher than that in rural areas.

In the Bombay Presidency the number of deaths from small-pox recorded during 1906 was only 4,063 (·22 per mille of population) as compared with 16,985 (·92 per mille) in the previous year. Deaths were reported from 225 of the 287 registration circles in the Presidency, but the disease was especially prevalent only in the southern registration and Karachi districts where 1,395 and 308 deaths, respectively, were recorded. The months of greatest prevalence were March and April. Of the total number of deaths recorded about 64 per cent. occurred among children under ten years of age.

In Ajmer-Merwara 271 deaths (·57 per mille) from small-pox were recorded during 1906 as compared with 277 (·58 per mille) in 1905. In Coorg the number of deaths reported as due to this disease was 234 against 132 in the previous year.

Plague.—The year 1906 was distinguished by a remarkable decline in the mortality from plague, the number of deaths recorded throughout the country falling from 1,143,933 in 1904 and 1,069,140 in 1905 to 356,721, the smallest total since 1901.

In the British provinces in 1904 the number of plague deaths registered was 938,010, and in the following year the number increased slightly to 940,821; in 1906 the total was 300,355, nearly the same as the number of deaths registered under the heading of dysentery and diarrhœa, and much less than half the number of deaths ascribed to cholera in the same areas in the same time. In 1905 the course of the epidemic was peculiar; the mortality during each of the first five months of the year was much greater and the mortality in the last seven months much less than the mortality in the corresponding months of the preceding year. In 1906 these relations were reversed; in the first eight months of the year the numbers of deaths were much lower and in the last four they were much higher than in the corresponding months of 1905. In the Native States the numbers of deaths aggregated 56,366 less than half the mortality recorded in 1905, the monthly totals in 1906 up to May being much lower and from June onwards considerably higher than in the preceding year.

The mean death rate from plague in the British provinces was 1·33 per thousand compared with 4·17 in 1905; males suffered less than females, the death rates of the sexes being 1·25 and 1·40 per thousand, respectively. The decrease in plague mortality was common to all the greater provinces, but in the United Provinces, the Punjab and Bengal it was specially large. In Burma and the Central Provinces and Berar the mortality increased, and although the figures in Eastern Bengal and Assam and in the North-West Frontier Province remained low, the increase in the latter province from 3 deaths to 41, including 39 indigenous cases, was ominous. The small province of Coorg alone was entirely free from plague. In all the British provinces, except Eastern Bengal and Assam, the North-West Frontier Province, Ajmer-Merwara and Coorg, and in all the

larger Native States plague deaths were reported in every month of the year. In Calcutta plague mortality fell from 7,372 deaths in 1905 to 2,606 in 1906, and in Bombay from 14,171 to 10,802, deaths occurring in both cities in every month of the year. In Madras the number of deaths rose from 22 to 56, deaths occurring in January, February, March and September.

The Plague Commission.—In these reports for 1904 and 1905 an account was given of the appointment in London of an Advisory Committee for the investigation of plague, of the appointment of a Commission to work under their direction in India, and of the earlier investigation carried out by the Commission. After continuous work for two years, when most of the problems set before them had been solved, the Commission was temporarily dissolved in May 1907. Reports of the investigations carried out by the Commission are being published by the Advisory Committee in special numbers of the *Journal of Hygiene*. This method of publication, although offering many advantages, presents certain defects. The reports are not published continuously, and they are necessarily couched in technical language, so that however widely they may be distributed it is doubtful if they would be read or understood by a public that it is desirable to reach. In order to redress these defects Major Lamb, the senior member of the Commission, was authorized to prepare a summary of the work done by the Commission in the form of a continuous narrative. This summary has been published and widely circulated; but it is not out of place here to describe briefly the work done and the conclusions which appear to be permissible, referring readers for details to the original reports in the *Journal of Hygiene* and to Major Lamb's summary—*The Etiology and Epidemiology of Plague.*

The state of knowledge when the Commission began their labours.—A reference to the reports for 1904 and 1905 will give some idea of what was known of the etiology of plague before the Commission began their labours. It was generally recognized that the rat was a most important factor in the spread of bubonic plague, and attention had been attracted by the work done at the Plague Research Laboratory by Colonel Bannerman and Captain Liston. Captain Liston made the discovery that guinea-pigs could be used to trap fleas in plague-infected houses, and that many of the guinea-pigs used for this purpose died of plague; and he found the bacilli of plague apparently multiplying in the stomachs of some of the fleas caught on the guinea-pigs. It had been shown that healthy animals could live along with plague-stricken animals and not contract the disease, and that the life of the bacillus in earth taken from the floors of Bombay houses was comparatively short. Attempts had been made to convey plague from one animal to another by means of fleas, but these attempts failed.

The work of the Commission.—The work of the Commission was carried on in Bombay City, in a few villages in its neighbourhood and in two villages in the Punjab, in all of which plague has been either continuously or intermittently prevalent since the beginning of the epidemic. In Bombay most of the houses, although large and high, are lightly built, masonry plinths are rare and most of the roofs are of country tiles. Between the houses are narrow passages in which there is communication with the sewers and storm water channels. The huts in the villages near Bombay are of flimsy construction with earthen floors and tiled roofs. The houses in the Punjab villages are built of mud or sun-dried bricks, floored with earth and roofed with country tiles or earth. The houses in Bombay and the villages have this in common, they offer every facility for infestation by rats; in Bombay and in Parel village the sewers and storm-water drains afford additional asylums for them. In Bombay City, stables, grain godowns and the like abound, and in the villages the people store their supplies of grain in their houses. In Bombay and the Punjab alike the people are tolerant of rats; and the rats fear man so little that they run about the houses freely even in the day time.

The Commission made arrangements to obtain as many rats as possible alive or dead. Living rats were examined to ascertain the number and kind of flea infesting them, and all rats were examined to ascertain the proportion attacked by plague. A record of particulars regarding all rats obtained was kept. The localities where plague-infected rats were found were noted for the purpose of determining the relationship between the disease in rats and in man.

The rats that carry plague.—It was found that in Bombay the common rats are *M. decumanus*, the gray rat, and *M. rattus*, the black rat. The former is the more numerous in stables, godowns, storm-water drains and sewers, and in the ground floors of houses; the latter is essentially a house rat; both species meet on the ground floors of houses, but ascending the house black rats become more common and gray rats more

rare. No gray rat was found higher than the third storey of a house. In the villages only the black rat is of importance so far as plague is concerned. It was found that both gray and black rats are infected and that the gray rat, probably on account of its larger size and consequent greater infestation by fleas, is attacked more frequently than the black rat.

The epizootic.—In Bombay the year may be divided into an epizootic season, from December to May, and a non-epizootic season, from June to November inclusive; but throughout the non-epizootic season there was never a week when less than 20 plague-infected rats were examined at the laboratory. The Commission found that an epizootic among gray rats preceded the epizootic among black rats by about 10 days, and that it was the gray rat that spread the disease throughout the city while the black rat was mainly responsible for its distribution in the houses. In the villages plague among rats did not persist throughout the year and new outbreaks of the disease could be traced to fresh infections. In the two Punjab villages acute infection among rats apparently disappeared, and, although chronic plague was found in a few rats, it seems exceedingly unlikely that this can give rise to acute infection. It does not follow, however, because acute infection disappeared from the villages under the observation of the Commission that it disappears similarly from all villages: deaths from bubonic plague are recorded in nearly every province during the non-epidemic season and, as will be seen, the occurrence of bubonic plague in man is evidence of the presence of acute plague among rats.

The relation of the epizootic to the epidemic.—In Bombay City it was found that just as the epizootic among gray rats preceded the epizootic among black rats by a mean period of about 10 days, so the epizootic among black rats preceded the epidemic by another interval of from 10 to 14 days. The relation of the epizootic to the epidemic in particular places was difficult to establish in Bombay City, but this was established in the Punjab villages; and it was found in Bombay City and in the villages that there was correspondence between the numbers of rats and human beings infected.

It was found that it was rare for more than one person in a house to be attacked, and that when more than one person was attacked, the attacks were as a rule nearly simultaneous.

The infection of plague. Fleas and soil.—Meanwhile it was shown in the laboratory that plague-infected animals do not infect healthy animals except when fleas are present; that plague can be carried from the sick to the healthy animal by means of fleas; and that the plague bacilli in grossly contaminated floors do not remain infective for more than 24 hours.*

Infection by feeding.—It was found possible to infect rats by feeding them upon grossly contaminated material or by causing them to eat the carcasses of rats that had died of plague. When, however, infection was induced in this manner the site of the primary bubo in 72 per cent. of the cases was one of the mesenteric glands, and the neck glands were involved in only 29 per cent. of the cases, while the inguinal and axillary glands were practically never involved. When rats are naturally infected the distribution of bubos is quite different. The primary bubo in natural infection is generally in the neck (74 per cent. of cases), the axillary and inguinal glands are often affected (25 per cent.), and in no single instance among 6,000 naturally infected rats examined after death, was the primary bubo found in the mesenteric glands.

The multiplication of bacilli in the stomach of the flea.—It was proved that the bacilli of plague multiply in the stomach of the flea; but the proportion of infected fleas varies in different seasons of the year, being six times greater in the epidemic season than in the non-epidemic season. In the epidemic season the proportion of infected fleas was greatest (43 per cent.) during the first four days after removal from the infected rat. After four days the percentage of infected fleas rapidly fell, although 9 per cent. were found to retain bacilli in their stomachs up to the twelfth day.

Mode of infection by the flea.—The question how the bacilli are transferred from the stomach of the flea into the blood of an animal was not an easy one to solve. It was found that in the flea the presence of bacilli was limited to the digestive tract. The rectal contents and fæces of infected fleas are loaded with bacilli, and it was possible to infect an animal by means of the fæces through the wound inflicted by the pricker. Although infection by a single flea was possible, it seems that the chance of an animal contracting plague after being bitten by a single flea is remote. Both male and female

* Annual Report of the Sanitary Commissioner with the Government of India for 1905, pages 119-121.

fleas (*P. cheopis*) convey infection ; and infection can be carried by *P. irritans* and *Ceratophyllus fasciatus*, but not apparently by *P. felis*.

Rat-fleas and man.—It was found that rat-fleas would bite man. They bite man most readily when starved from 72 to 96 hours, but unless they were very numerous they would not bite man in the presence of their natural host the rat. It was found that rat-fleas might be attracted by man, jump on to his clothes, but not feed on him at once. The importance of this observation from an etiological point of view is obvious ; an infected rat-flea may be carried on a man's clothing from one place to another and, without biting him, leave the man's clothing for a rat when an opportunity offers.

It was ascertained that rat-fleas could be kept alive for from three to four weeks when fed on human blood alone, and that rat-fleas deprived of all food never survive longer than seven days.

The seasonal prevalence and persistence of plague.—The most striking fact in the epidemiology of plague is its apparent dependence upon climatic variations; its disappearance when the temperature becomes very high and its re-appearance when the temperature falls. How does the bacillus maintain an existence during the non-epidemic season, and what are the factors which influence the seasonal prevalence of the epidemic ? We have seen that the life of the bacillus in the soil is comparatively short, and that plague in man is dependent upon plague in the rat. There is no reason to suppose that man harbours the bacillus after recovery from an attack of plague, and, although chronic plague does occur among rats, the development of acute plague from a chronically infected rat appears to be hardly possible. The only obvious way, then, in which the disease could be maintained during the non-epidemic season is by the occurrence of a chain of cases of acute plague among rats. In the cities of Calcutta and Bombay plague occurs among human beings throughout the year, and from different areas in all the widely-infected provinces deaths from plague are reported in every month of the year. If human cases derive their infection from rats it follows that acute plague in rats must occur throughout the non-epidemic season, although the cases may not be numerous.

Breeding season of rats.—Full details regarding the breeding seasons of rats in different parts of India are not yet available, but it was ascertained by the Commission that in Bombay and the Punjab, although rats breed throughout the year, they breed most freely in the seasons between epizootics.

Seasonal prevalence of fleas.—It was also ascertained that in Bombay and the Punjab there is a definite seasonal prevalence of fleas, and that the season of their greatest prevalence coincides in point of time with the epidemic of plague. The facts on which the prevalence of fleas depend have not been fully ascertained, but it has been found that a high temperature restricts their breeding, restraining the adult from laying eggs and delaying or preventing the development of eggs into larvæ.

The effect of a high temperature on the bacillus in the flea.—A high temperature—85° F., and over, affects the fate of the bacillus of plague in the stomach of the flea. It is cleared out of the stomach more rapidly than when the temperature is lower, say, 70° F. At the high temperature fewer transmission experiments by means of fleas succeed, and the flea retains the power to infect for a shorter time than at the low temperature.

The effect of a low temperature on plague.—A low temperature—below 50° F., limits the spread of plague, because when the temperature is low infected rats generally die of plague before the bacilli reach the blood, and thus fleas have few opportunities of ingesting bacilli.

Conclusions.—Few will be found to deny the validity of the proof that plague is carried from rat to rat by means of the rat-flea ; but it is contended that the evidence that plague is carried from rat to man by means of the flea is inconclusive. The direct proof is certainly wanting ; but all susceptible animals on which experiments have been tried can be infected through the rat-flea, and apparently this is the means by which the disease is spread among animals in nature. The rat-flea will bite man under certain conditions, the very limitations of which seem to furnish additional evidence of the correctness of the flea theory in respect of man, because they explain satisfactorily facts of the epidemiology which are otherwise mysterious.

In the present condition of knowledge it must, I think, be accepted that bubonic plague is spread by infected rats, the vehicle of contagion between rat and rat and rat and man being the rat-flea ; and that the life of the bacillus outside the bodies of animals and certain insects is of comparatively short duration.

Pneumonic plague is directly infectious from man to man by inhalation, but this form of the disease is rare and plays but a small part in the general spread of the epidemic.

Inoculation.—The Director of the Bombay Bacteriological Laboratory reports that since January 1897 when the first doses of prophylactic vaccine were issued, 6,321,578 doses have been despatched from the laboratory and that of these doses 5,754,044 have been issued to medical men in India. The number of doses issued in 1906 was, however, only 176,651 as compared with 315,905 in the previous year. In all probability this decline was due to the greatly diminished prevalence of plague during 1906, for it is well known that the majority of natives are willing to resort to inoculation only when the disease is very severely epidemic among them. The decline has also been attributed to people having temporarily avoided inoculation in the hope that a less disagreeable method of protection from plague might be discovered by the Plague Research Commission, and it is said that now the results of the investigations of the Commission are known there are signs that inoculation will be resorted to more frequently. Further experience of the use of the vaccine by a large number of medical men has served to confirm the opinion as to the great value of the method in reducing the case-incidence and the case-mortality from plague, and during the year under review no untoward result from inoculation was reported.

The destruction of rats.—The destruction of rats was carried out during 1906 to a greater or less extent in nearly all provinces where plague prevailed and there is considerable evidence that the measure can be undertaken without exciting the prejudices of any but a small minority of the people. Chiefly on account of the results reported in a campaign against rats carried out at Tokio in Japan, attempts have been made to minimize the value of rat destruction as a means of preventing plague, but it is obvious that since bubonic plague is transmitted not from man to man but from rat to man every infected rat destroyed means the removal of a source of infection. There are probably few places where the extirpation of rats can be accomplished solely by official agency, but the efforts now being made are of educative value, and in the present state of our knowledge wherever the measure of rat destruction can be thoroughly carried out it should be adopted. In Bengal rat killing was vigorously carried out during 1906 in the districts of Monghyr and Saran, in the towns of Modhubani and Bhagalpur and in the circles of Monghyr and Jagadispur, 356,662 rats being destroyed in these localities. In five other towns less vigorous measures resulted in the destruction of 26,684 rats during the year. In Calcutta, where a reward of two annas was paid for each live rat obtained, more than 145,000 live and dead rats were collected during the year. A systematic and very energetic campaign extending from April 1905 until March 1907 has been conducted in the Jagadispur municipality and surrounding villages. As far as possible the operations were confined to an area of about 20 square miles, which included the municipality and nine villages, the population in the area being 20,501. The total number of rats killed during the period of the experiment is stated in the report of the officiating magistrate to have been 1,409,351, of which 459,878 were killed in the municipality of Jagadispur which has a population of 11,431 people. The total cost of the operations (including the rewards paid for rats) is said to have been £ 1,677 or about ¼*d.* per rat killed. The operations appear to have banished plague from the municipality—there were 60 cases in 1902, 324 cases in 1903, 151 cases in 1904, and 99 cases before the operations commenced in 1905; from June 1905 until April 1907 there was no case. It is not stated in the report whether any approach to extermination of the rats was effected but from the fact that during March 1907 nearly 50,000 rats were killed in the municipality and over 97,000 in the other parts of the area it does not appear that such was the case. In the Punjab, systematic operations for the destruction of rats were carried out during the plague season of 1906-07 in 8,650 villages and 70 municipal towns. In villages the use of poisoned baits was the method chiefly relied upon; in towns this method and trapping were employed. No figures showing the number of rats killed are given in the special report on the operations, but in the annual report of the provincial Sanitary Commissioner it is stated that during the operations carried out in the latter half of the season 1905-06 over one and a half million dead rats were found, and that for various reasons this number was considered to be only a small proportion of the actual number killed. It is said that in some places the results were unsuccessful because the inhabitants collected and threw away or buried the baits after they had been laid, but that these difficulties disappear as the staff and the people gain experience and that a second trial

of the measure is usually accepted readily. The Inspector-General of Civil Hospitals remarks that "all reports agree that the mass of the people accept rat destruction and in many places even ask for it; in some the people do it themselves." In the Bombay municipality the campaign against rats, which had been begun in July 1905, was vigorously continued, 231,392 rats being collected during 1906 and sent to the Bombay Bacteriological Laboratory for examination. Of the 131,322 rats examined 18,572 or 14·14 per cent. were found to be infected with plague. The first of a series of specially organised campaigns was conducted in Fort North section of "A" ward early in 1907. The area of this section is ·2f of a square mile and it was mapped out into divisions, circles, and blocks, each under the charge of one or more supervisors and inspectors. The residents were previously informed of the campaign by the distribution of handbills printed in English, Marathi and Gujrathi. The important feature of the campaign was that a very large number of baits (100,000 or more) were prepared beforehand so that on the evening when the operations were begun baits could be deposited in a very short time in all the gullies, culverts, drains and on the floors of houses throughout the area. On the next and following mornings search for poisoned rats was made. The cost of the experiment (excluding the cost of the poison) was £ 25, and 1,362 dead and living rats were collected. Similar campaigns are being carried out in other parts of the city. In Burma 4,366,869 rats were killed during 1906 at a cost of £ 16,884 or about a penny per rat. An energetic campaign was conducted in the town and district of Sagaing, the population of the town being 9,643 and of the district 273,015. The provincial Sanitary Commissioner reports that up to the 31st of March 1907, 35,679 rats had been killed in the town and 2,047,612 in the district. In the Central Provinces and in Madras the destruction of rats by poisoning and trapping was largely practised.

Plague in Bengal.—The number of deaths registered as due to plague in Bengal fell from 126,084 in 1905 to 59,649 in 1906 and the death rate fell from 2·52 per thousand to 1·51. Of the 33 districts only 9 were entirely free from the disease, but in many others the numbers of deaths were comparatively small. Mortality was, as usual, highest in the districts of the Patna division, especially Patna (death rate 9·15 per mille) and Saran (6·44), in the urban district of Calcutta (3·07) and Shahabad (3·01). Except in Calcutta, where the male death rate was considerably the higher, and in districts in which very few deaths were recorded, females suffered more severely than males, the death rates being 1·03 per mille among males and 1·31 among females. Nearly three-fourths of the municipal towns escaped, but many of those attacked suffered severely, notably Monghyr (death rate 48·94 per mille), Tikari (35·10) and Revelganj (29·49) so that the mean urban mortality from plague (4·94) was more than five times as much as the mean rural mortality (·92). The epidemic followed the usual seasonal distribution in Bengal—the numbers of deaths increasing steadily from January until March, a slight fall in April, followed by great falls in May and June; after the minimum in July a gradual rise until November followed by a considerable rise in December.

Plague in Eastern Bengal and Assam.—The immunity from plague enjoyed by this province was maintained, but during the year there were three outbreaks of pneumonic plague resulting in 74 deaths. The details of the occurrence of plague in a region which has enjoyed immunity from the general epidemic are evidently of special interest. In March 1906, a man, said to have been employed in a jute mill near Calcutta, was travelling with two companions to his home in the Pabna district. On the steamer he died of pneumonic plague. His companions took his corpse on shore and carried it a distance of 5 or 6 miles to his village, where it was buried. Both men were attacked by pneumonic plague and conveyed infection to 27 other persons. Of the 27 cases 24 died. In June there were two outbreaks in the Bajitpur *thana* of the Mymensingh district, both of which were due to importation from Calcutta. In the earlier outbreak there were 5 attacks and 5 deaths; in the later 50 attacks and 45 deaths. All were cases of pneumonic plague.

Since 1898 there have been eight outbreaks of plague in Eastern Bengal and Assam, including the three described and the outbreak in Dibrugarh in 1903. The provincial Sanitary Commissioner notes regarding them that "with the exception of the outbreak in Dibrugarh town, the epidemics all seem to have been of the same nature. They all occurred in typical Bengal villages, in which each homestead consists of a group of three or four huts built round an open square courtyard, surrounded by an ample compound and shut off from the neighbouring *baris* on all sides by a thick jungle of bamboos and palms." In every instance except the Dibrugarh outbreak, the first case came from Calcutta, the epidemics were "almost entirely of a pneumonic character," there was

nearly always a history of direct infection from case to case, and whole families living in the same homestead died. At Dibrugarh, where the epidemic resembled those common in Northern India, the disease first appeared among rats, the cases were Bubonic, and the number of persons attacked in any household was small. Enquiries regarding the distribution of rats in the Province are being carried out. Lieutenant-Colonel Hare, I.M.S., states that "rats are by no means common in the rural areas of the lower districts. The country is hardly above the flood-level of the tidal rivers and it is difficult for them to find food or migrate from one village to another."

Plague in the United Provinces.—The number of plague deaths registered fell from 383,802 in 1905 to 69,660, and the death rate from 8·05 to 1·46. Only three districts—Almora, Jhansi and Hamirpur, escaped altogether, but in seven other districts the number of deaths recorded was less than one hundred. Among these were Agra and Muttra. In Agra only three deaths were recorded and in Muttra, where the deaths in 1905 numbered 47,974, there were only 21. The highest district death rates occurred in Ballia, 7·82 per thousand, Bijnor, 5·47, and Muzaffarnagar, 4·17. In rural areas the mean death rate was 1·25, compared with 4·29 in the towns. Of the 106 towns with a population of over 10,000, only 30 escaped, and in five—Chandausi (46·01), Mehndawal (23·76), Mau (23·00), Khairabad (22·80) and Gangoh (21·97) the rates were over 20 per thousand. The mortality rose rapidly from the beginning of the year until March, fell very slightly in April and rapidly in May and June, to a minimum in July, after which it rose gradually until November and very rapidly in December. Females suffered more than males, the death rate among the former being 1·68 per mille compared with 1·25 among the latter.

Plague in the Punjab.—The mortality from plague in the Punjab was much lower than in any year since 1901, the number of deaths recorded being 104,863 compared with 390,233 in 1905 and 402,950 in 1904. Of the total, 92,115 occurred in the British districts and 12,748 in Native States. In the British districts the mean death rate was 4·56 compared with 16·65 in 1905 and a mean of 11·17 in the previous five years. The districts of Simla, Jhang, Multan and Dera Ghazi Khan were free from the disease, and the mortality in Mianwali (7 deaths), Muzaffargarh (34), Attock (59) and Kangra (84) was slight. In rural areas the mean death rate was 4·45 per thousand compared with 5·53 in the towns. Except in Delhi and Gurgaon very few of the towns in infected districts escaped, and in many the mortality was exceedingly high, notably in Dharmkot, (death rate 46·80), Garhdiwala (37·24), Bhiwani (36·42) and Zira (35·49).

Mortality increased rapidly until April, remained stationary at a high figure in May, fell rapidly in June and again in July, reached the minimum in August, after which the numbers of deaths rose rapidly until the end of the year. Females died at the rate of 5·14 per thousand and males at the rate of 4·06.

Regarding the attitude of the people the Inspector-General of Civil Hospitals writes:—"Although generally apathetic, the people are gradually becoming less suspicious of proffered assistance."

Plague in the North-West Frontier Province.—Hitherto plague in this province has been restricted to imported cases, but in March 1906 there was an outbreak of pneumonic plague in the Hazara district. The disease was imported from Rawalpindi whence a man suffering from plague went to the village of Ghazi, where he died. His relatives, who lived in the same house, contracted the disease which spread to three other villages. The villagers refused to allow preventive measures to be taken, but fled from the village. The inhabitants of the neighbouring villages, however, refused to take them in and they had to live in the open air. The disease soon disappeared, but not before 44 cases had occurred, of which 40 proved fatal. There were other 3 cases in the province—2 in Peshawar city and 1 in Dera Ismail Khan.

Plague in the Central Provinces and Berar.—In 1904 there were 32,820 deaths from plague in these provinces; in the following year the total fell to 5,345, and in 1906 the number again rose to 18,121. Only two districts—Narsinghpur and Betul, were entirely free from the disease, but its occurrence in the districts of the Vindhyan and Mahanadi divisions was limited to a few cases.

The districts of Nagpur (death rate 15·39 per mille), Buldana (3·53), Akola (3·19) and Nimar (2·45) suffered most severely. The mean mortality in rural areas was ·59 per thousand, but in the towns it was 9·55. In a few of the towns the death rates were enormous; in Kalmeshwar it was 129·78, in Saoner 84·18 and in Kamptee 65·52. In Nagpur the number of deaths recorded was 5,432, equal to a death rate of 42·52 per thousand.

In January the number of recorded deaths was 1,264, in February 3,022 and in March 3,690; in April the number fell to 1,700 and in May to 53. In June only 4 deaths were registered and in July 15; after which the monthly totals rose to 2,620 in October, falling to 1,656 in November and again rising to 1,938 in December. The general death rate was 1·53; males suffered more than females, the death rate of the former being 1·62 per mille and of the latter 1·43.

The attitude of the people has improved greatly; they understand the necessity of excluding from their villages arrivals from infected areas; they are ready to evacuate their villages, and suspicions regarding official action are passing away.

Plague in Madras.—The number of deaths fell from 20,125 in 1904 and 5,788 in the following year to 898 in 1906. The district most severely affected was Bellary, where 325 deaths occurred. The general death rate was ·02. As in the Central Provinces and Berar, males suffered more than females, the deaths of 464 of the former being reported against 434 of the latter.

Plague in Bombay.—The number of deaths from plague which had fallen from 223,957 in 1904 to 71,363 in 1905, fell further in 1906 to 51,525, the smallest total since 1900. Only the districts of Thar and Parkar, Larkhana, Sukkur and Upper Sind Frontier escaped entirely, but the mortality in Hyderabad, Bijapur and Kanara was inconsiderable. The urban district of Bombay suffered most severely, but the death rate of 14·20 per mille was much lower than in the previous year, 18·63, and the quinquennial mean, 21·28. In the district of Poona mortality was exceedingly heavy—12·75 per thousand and the death rates in Kaira, 7·87, Karachi, 5·24, Panch Mahals, 4·80, Satara, 4·75, and Ahmedabad, 3·76, were high. Few of the towns escaped, and the mean death rate among the urban population was 10·88 per thousand compared with 1·57 among the population of rural areas. In Poona city the number of deaths registered was 7,319, equal to the enormous death rate of 60·72 per thousand.

The numbers of deaths rose slowly to 6,108 in April and then fell slowly to a minimum of 612 in July; a sudden rise in August, owing to the outbreak in Poona, was followed by the highest monthly figures in September, 8,435 and October 8,619, after which the totals fell to 5,381 and 4,801 in November and December, respectively. Males suffered more than females, the death rates being 2·93 and 2·63, respectively, but in many districts, notably Sholapur, Satara, Ratnagiri and most of the districts in Gujarat and in the south of the Presidency, the female death rates were the higher.

Plague in Burma.—The total number of recorded plague deaths rose from 3,692 in 1905 to 8,637. Of the total, 5,223 occurred in Lower Burma, where the plague death rate was ·94 compared with 1·17 in Upper Burma. The districts of Akyab, Kyaukpyu, Sandoway, Tavoy, Mergui and Magwe escaped altogether, and in Pegu, Maubin, Pyapon, Thaton, Thayetmyo, Shwebo, Pakôkku and Kyaukse the occurrence of the disease was limited to a few cases. The highest death rates were 11·79 in Rangoon and 6·87 in Mandalay, the only other rates over 1 per mille being 2·40 in Amherst, 2·09 in Meiktila and 1·28 in Prome. In Lower Burma the number of deaths that occurred in rural areas was very small, only six districts being affected and in two of these only single deaths were reported, and the rural death rate was ·05 compared with 6·98 in the towns. In Upper Burma the rural death rate was ·27 compared with 8·98 in the towns.

In both provinces deaths were recorded in every month in the year; in Lower Burma the heaviest mortality occurred during the rains; in Upper Burma the maximum occurred in March. In both provinces males suffered more than females.

Plague in Ajmer-Merwara.—The number of deaths from plague in Ajmer-Merwara fell from 2,480 in 1905 to 68, the death rates among males and females, respectively, being ·16 and ·12 per thousand.

Plague in Coorg.—For the second year in succession the small province of Coorg was reported to be free from plague.

Fevers.—The total number of deaths recorded in British territory in India during 1906, under the heading "fevers" was 4,452,842 as compared with 4,417,655 during 1905, the ratios per thousand of the census population being 19·69 in 1906 and 19·57 in 1905. As a rule the number of deaths recorded as due to fever does not vary greatly from year to year, but during the ten years ending with 1906 there were registered in all 43,641,844 deaths under this heading as compared with 40,221,452 during the ten years ending with 1896. In the year under review 56 per cent. of the deaths from all causes were registered under this heading and, as usual, there were many towns and villages especially in Bengal, Eastern Bengal and Assam, and the Punjab, in which over 80 per

cent. of all the deaths that occurred were so recorded. The death rate recorded from all other causes than fever was only 15·0 per thousand of the population. When reference is made to fever in India malarial fever is generally understood, but it is obvious from the figures just given that many causes of death and many diseases much more fatal than malarial fever are included under the heading. At present it is not possible to ascertain with any degree of accuracy what proportion of the deaths recorded under "fevers" in India is due to malaria, but from various considerations and from the results of enquiries that have been made it may be said that for India as a whole the proportion is almost certainly not higher than between 20 and 30 per cent.; in all probability it is much lower. The following are some of the considerations and enquiries upon which this estimate is based. In 1905, excluding Burma and the small provinces of Ajmer-Merwara and Coorg for which no returns are available, the diseases of 141 patients out of every 1,000 who attended for treatment at the dispensaries in India were diagnosed as malarial fever. A considerable number of the patients who attend at dispensaries are suffering from surgical diseases, which causes the figure to be smaller than it would be if all were medical cases, but, on the other hand, it has to be remembered that the diagnosis of malarial fever is made in almost all cases without the help of the microscope and that for this reason a number of diseases other than malaria are doubtless included under the heading. For the purposes of the argument we may also eliminate the possibility that the ratio 141 per 1,000 is too low, by assuming that it represents not the proportion of the total sickness in India which is due to malaria but the proportion of the total mortality which is due to this cause. On this assumption the number of deaths from malarial fever in 1905 would have been about 1,144,605 which is 25·9 per cent. of the mortality recorded under the heading fever during that year. In 1906, excluding two or three provinces for which no returns are available, the dispensary figures show that the diseases of about 148 out of every 1,000 patients were diagnosed as malarial fever, and applying this figure in the same manner as has been done above, the number of deaths from malarial fever in 1906 would have been 1,162,144 which is 26·0 per cent. of the mortality recorded as due to fever during that year. It is, of course, very far from the truth to say that all who suffered from malarial fever during these years died, but for the purposes of the argument it serves to show that the estimate of between 20 and 30 per cent. mentioned above is certainly not too high. An enquiry made by private practitioners in 1894 into the causes of 14,660 deaths in the United Provinces showed that 44 per cent. of the mortality which had been recorded under the heading *fever* was due to this cause, but in this investigation no attempt was made to define the nature of the fever, so it is fair to assume that a much lower percentage was due to malarial fever. In the Dinajpur district in Bengal in 1904 Captain Rogers, I. M. S., sought out the relatives of 1,000 people whose deaths had been recorded under the heading fever and enquired from them the symptoms, course and duration of the illness in each case. He concluded that only 31·8 per cent. of these deaths were in reality due to malarial fever. A similar enquiry carried out more recently by Captain Stewart, I.M. S. and Lieutenant Proctor, I.M S., in three other districts in Bengal resulted in the observation that 36·1 per cent. of the deaths which had been recorded under the heading fever were due to malarial fever. An Assistant Surgeon and two Hospital Assistants are at present employed in carrying out a similar enquiry in the Galsi *thana* of the Burdwan District in Bengal. The enquiry began on the 1st of August 1906 and up to December the 31st the causes of 919 deaths, 752 of which had been recorded in the *thana* register under the heading fever, had been investigated. The results showed that of the 752 deaths returned as due to fever only 303 or 40·2 per cent. were in reality due to this cause. The proportion of this percentage which was due to malarial fever was not ascertained.

If we assume that the true mortality from malarial fever in India is 25 per cent. of the mortality recorded under the heading fever the number of deaths due to malarial fever among the civil population during 1906 would have been 1,113,210 and the death rate 4·9 per mille of population. Malarial fevers were considerably more prevalent in nearly all the provinces of India during 1906 than during 1905, but the extent of the increased prevalence is not indicated by the comparatively small rise (namely, 35,187) in the total number of deaths recorded under the heading fever. This is due chiefly to the fact that in Bengal 81,908 fewer deaths were recorded under the heading and in Eastern Bengal and Assam 60,527 fewer deaths; in all other provinces there was a considerable rise in the number of deaths attributed to this cause. The largest number of deaths and the highest death rate from fevers during the year were recorded in the United Provinces, but there is no doubt that this is not the province in India where malarial fevers are most prevalent and severe. For India as a whole November was the month

in which most deaths from fever were recorded and February the month in which fewest were recorded.

In Bengal the recorded death rate from fevers during 1906 was 22·41 per mille of population as compared with 24·34 per mille in 1905, the total numbers, in the two years being, respectively, 1,132,579 and 1,214,487. The mortality shown under this heading was greatest in October and November and least in June and February. Anti-malarial operations, which consisted chiefly in filling up hollows and depressions, clearing jungle, and spreading kerosine oil on "tanks" and cesspools, were carried out in four towns at a total cost of £595. During the year a committee was appointed with a view to ascertain how far the prevalence of malarial fever in the province is due to defective drainage and whether a drainage scheme to remedy the evil is practicable.

In Eastern Bengal and Assam 645,733 deaths from fever were recorded (21·65 per mille of population) as compared with 706,260 deaths (23·68 per mille) in 1905. Over 68 per cent. of the total mortality was recorded under this heading. Dinajpur was the district in which the highest death rate from fevers was recorded (namely, 41·18 per mille of population), but in this district over 91 per cent. of all the deaths were recorded as being due to this cause, and the number of deaths registered as due to respiratory diseases was only 21 or 1 per 100,000 of the population. The total number of deaths recorded as due to kala azar in the province was 2,407 as compared with 3,030 in the previous year and 3,748 in 1904. Deaths from kala azar were reported in all districts except Cachar, but there is reason to believe that the disease is gradually disappearing from all parts of the province. During the year a memorial was presented to the local Government by the Duars Planters' Association asking that a special enquiry regarding blackwater and other fevers in the Duars should be made. The Government of India decided that an investigation was necessary and this is now being conducted under the direction of an Advisory Committee consisting of the Sanitary Commissioner with the Government of India, the Director of the Central Research Institute, the Professor of Pathology at the Medical College, Calcutta, Captain S. P. James, I.M.S., and Captain S. R. Christophers, I.M.S.

In the United Provinces 1,317,491 deaths (27·62 per mille of population) were ascribed to fevers during 1906, the number being higher by 33,327 than in the previous year. Malarial fevers were considerably more prevalent than in 1905, the proportion of cases diagnosed under this heading among patients treated at dispensaries rising from 155 per 1,000 of all cases treated in 1905 to 172 per 1,000 in 1906. The recorded mortality from fevers in towns was higher than in rural areas; in one town (Nagina) the death rate recorded under this heading was 84·31 per 1,000 of the population and in another (Deoband) it was 70·61 per 1,000. In the first of these towns, however, more than 72 per cent. of the total mortality was recorded as due to fever and in the second more than 97 per cent.

In the Punjab during 1906 the total number of deaths recorded as due to fever was 407,878, giving a ratio of 20·28 per mille of population as compared with a total of 370,947 and a ratio of 18·40 per mille in 1905. The mortality recorded under this heading during the first eight months of the year was less by 36,698 than during the same period in 1905, but the mortality recorded during the last four months was greater by 74,529. The proportion of cases diagnosed as malaria in dispensaries rose in 1906 to 170 per 1,000 of the total number of patients treated as compared with 112 per 1,000 in 1905 and there is little doubt that the increased prevalence of malaria—which was due, it is said, to the monsoon rainfall being heavier than usual—was an important factor in causing the increase in the mortality recorded under the heading fever. The districts of Mianwali, Karnal, Dera Ghazi Khan and Muzaffargarh were among those in which the death rates from fever were very high. The provincial Sanitary Commissioner reports that the country was flooded in the Mianwali district by the river Indus and in the Muzaffargarh district by the river Chenab. It is said that in the Karnal district large areas of land were under water for a long period, and that in the Dera Ghazi Khan district the mortality was especially heavy in the Tounsa *tahsil* which lies near the foot of the hills and is liable to inundation.

In the North-West Frontier Province the recorded number of deaths from fever was 52,039 in 1906, as compared with 41,190 in 1905, the ratios per mille of population being 26·14 and 20·69, respectively. Malarial fevers prevailed with unusual severity during the last four months of the year and more than half the total number of deaths recorded under the heading fever occurred during this period. The diseases of about 266 patients out of every 1,000 who attended for treatment at the different dispensaries in the

province during the year were diagnosed as malarial fever, and judging from this as well as from the report of the provincial Sanitary Commissioner it is probable that during 1906 the prevalence and severity of malarial fever was greater in this than in any other province.

In the Central Provinces and Berar 225,141 deaths (18·95 per mille of population) were ascribed to fever during 1906 as compared with 207,195 (17·43 per mille) in 1905. The death rates from fevers recorded in all except six of the 24 districts were higher than in the previous year. The provincial Sanitary Commissioner says there is reason to suspect that many deaths from dysentery, diarrhœa, influenza and measles are included in the mortality attributed to fever and the Civil Surgeon of Nimar reports that in some large villages every death is ascribed to this cause. In dispensaries the proportion of cases diagnosed as malarial fever to the total number of patients treated fell slightly as compared with the previous year. Anti-mosquito operations were carried out on a small scale in a few towns, notably in Badnur, Jubbulpore, and Khandwa.

In Lower Burma the recorded death rate from fevers was 9·77 per mille as compared with 8·97 per mille in 1905; and in Upper Burma it was 7·34 as compared with 6·76.

In the Madras Presidency the death rate recorded from fever in 1906 was, as usual, much lower than in any of the other large provinces. The total number of deaths recorded under this heading was 304,926 (8·4 per mille of population) as compared with 265,044 (7·2 per mille) in 1905. The proportion of deaths recorded under this heading to the total mortality from all causes fell from 33·7 per cent. in 1905 to 30·5 per cent. The highest rates recorded in districts were 21·2 per mille in Vizagapatam, 17·2 per mille in Ganjam and 14·2 per mille in Guntur, and the highest in towns 30·7 per mille, 28·8 per mille and 21·5 per mille. Out of the total of 232 towns in the Presidency, these were the only ones where the death rate recorded from fevers was over 20 per mille. The proportion of cases diagnosed as malarial fever in the dispensaries during 1906 was 71 per 1,000 of the total number treated as compared with 65 per 1,000 in 1905.

In the Bombay Presidency the number of deaths recorded as due to fever was 274,653 (14·86 per mille of population) as compared with 245,373 (13·28 per mille) in 1905. Malarial fevers were much more prevalent than in the previous year, especially in the Sind registration district, in which death rates from fevers of 35·90 per mille, 29·08 per mille and 24·14 per mille were recorded in the Sukkur, Larkhana and Upper Sind Frontier collectorates, respectively.

In Ajmer-Merwara 12,292 deaths were ascribed to fevers in 1906 as compared with 10,336 in 1905; and in Coorg 4,266 as compared with 3,876.

Sale of quinine.—In Bengal there was again a reduction in the amount of quinine sold, 32,189 parcels (each containing 102 seven-grain packets) having been disposed of as compared with 35,472 in 1905. The decrease is attributed to the lesser prevalence of malarial fevers. More than half the total number of parcels were sold during the period from August to November. Increased facilities are being afforded for the purchase of the drug at dispensaries and post-offices and from village schoolmasters.

The system of distributing pice (¼*d*) packets of quinine from central stations was abolished in the Assam and Surma valley districts of Eastern Bengal and Assam in 1905. Depots under the direction of the Civil Surgeon were opened at each head-quarter station, the price of the drug was reduced, and the number of recognised agents for its sale was increased. The number of packages, each containing 102 seven-grain powders, sold in these districts of the province increased from 1,021 in 1905 to 2,094 in 1906 and in November of the latter year a similar system was brought into force in the Eastern Bengal districts.

In the United Provinces 1,205,181 powders, each costing one-quarter penny, were sold during 1906 as compared with 643,668 during 1905. Quinine is sold at post-offices and by vaccinators and school masters; and in certain districts in the Rohilkhand, Allahabad, Lucknow and Fyzabad divisions it is sold by landlords and their agents. Large quantities of quinine were distributed gratuitously, especially in districts affected by famine.

In the Punjab quinine was, as usual, distributed gratuitously in a number of districts through the agency of vaccinators, *tahsildars* and headmen of villages, but no details regarding the amount sold at post-offices, are contained in the provincial Sanitary Commissioner's report.

In the Central Provinces and Berar 4,362 parcels of quinine, of which 500 contained 102 five-grain powders, and 3,862 contained 102 seven-grain powders, were sold during 1906 as compared with 4,887 parcels in 1905. The drug is sold at post-offices and by

stamp vendors, school masters and *patwaris*. The decrease in the amount sold is attributed to villages being vacated on account of plague.

In Burma 9,173 parcels and 63 powders of quinine (that is 733,903 seven grain packets) were sold at post-offices and by vaccinators and district officials during 1906 as compared with 6,996 parcels and 39 powders in 1905. It is said that the Burmese prefer to take the drug made up in the form of compressed tablets rather than in powder and it has been decided to issue a certain amount of the drug in this form.

* Details are wanting regarding the sale of quinine in the North-West Frontier Province, Madras and Bombay.

Dysentery and diarrhœa.—The number of deaths recorded in British territory in India under the heading dysentery and diarrhœa rose from 264,124 in 1905 to 298,117 in 1906, and the death rate per mille of population from 1·17 to 1·32 which is the highest rate recorded since 1900. It is almost unnecessary to say that the number of deaths and the death rate recorded do not represent, even approximately, the true mortality from these causes. In the Gaisi *thana* in Bengal during the year ending July 1907 it was found that 231 deaths which had been recorded under the heading "fever" and 128 deaths which had been recorded under the heading "other causes" were due to dysentery or diarrhœa. A higher mortality than in 1905 was recorded in all provinces except the United Provinces in which, however, the decrease in the number of deaths recorded amounted to only 184. In India as a whole the greatest number of deaths were, as usual, recorded under this heading during August and September and the smallest number during February and March.

In Bengal 48,920 deaths were registered under the heading dysentery and diarrhœa during 1906 as compared with 45,260 during 1905. The highest death rates were recorded in the districts of Howrah (4·09 per mille of population), Cuttack (3·67), Puri (3·61), Darjeeling (3·45), Calcutta (3·22) and Patna (3·14). Death rates over 2 per mille were recorded in only two other districts. There were three towns in which no death from these causes was reported and six towns in which only one was reported. The death rate recorded in towns was more than three times as high as in rural areas. In Eastern Bengal and Assam 26,912 deaths were attributed to dysentery and diarrhœa in 1906, the death rate per mille of population being ·90 as compared with ·85 in the previous year. The death rates recorded in districts varied between 5·58 per mille in Lakhimpur and ·05 per mille in Dinajpur. December was the month in which most deaths were recorded under this heading and August the month in which fewest were recorded. In the United Provinces the recorded mortality from dysentery and diarrhœa was almost the same as in the previous year; the death rate (·55 per mille) was lower than in any other province except the North-West Frontier Province. The greatest number of deaths were recorded under this heading in May and the smallest number in February. The highest death rates recorded in districts were 9·17 per mille in Garhwal and 4·02 in Almora; and the highest in towns 7·72 per mille in Ballia and 7·05 in Benares. The death rate recorded in towns was five times as high as in rural areas. In the Punjab 17,595 deaths (·87 per mille of population) from dysentery and diarrhœa were recorded during 1906 as compared with 13,762 deaths (·68 per mille) in 1905. Jhelum, Rawalpindi, Ambala and Simla were the districts in which the highest death rates were recorded, the rates in these varying between 2·07 and 1·69 per mille of population. The death rate recorded in towns was 2·28 per mille and in rural areas ·72 per mille. In the North-West Frontier Province 571 deaths were attributed to dysentery and diarrhœa as compared with 562 in 1905. In the Central Provinces and Berar the recorded death rate from dysentery and diarrhœa rose from 3·02 per mille in 1905 to 3·58 in 1906. The rate is the highest recorded in any province during the year. The mortality recorded under this heading was higher than in 1905 in all except five of the districts and in all except 39 of the towns. The death rate recorded in Berar was 8·91 per mille and in the Central Provinces it was only 1·98; there are four districts in Berar and the rates recorded in them were 12·45 per mille in Akola, 9·06 per mille in Buldana, 7·12 per mille in Amraoti and 6·31 per mille in Yeotmal. The Civil Surgeon of the Yeotmal district reported that the high death rate was due to a number of deaths from cholera having been returned under the heading dysentery and diarrhœa. In Lower Burma in 1906 the recorded death rate from dysentery and diarrhœa was 1·65 per mille of population as compared with 1·43 in 1905 and in Upper Burma it was ·68 as compared with ·44. The provincial Sanitary Commissioner considered it possible that the increase may have been due partly to the registration of deaths from cholera under the heading dysentery and diarrhœa. In the Madras Presidency 61,588 deaths from dysentery and diarrhœa were

recorded as compared with 51,298 in 1905, the death rate being 1·7 per mille as compared with 1·4. In the opinion of the provincial Sanitary Commissioner many cases of cholera may have been returned under this heading. The death rate recorded in town circles was nearly three times as high as in rural districts and it was higher by ·1 than in the previous year. In the Bombay Presidency 61,736 deaths were recorded under the heading dysentery and diarrhœa during 1906, the death rate (3·34 per mille) being higher by ·34 than in 1905. The number of deaths was larger than that recorded in any other province during the year and the death rate was higher than in any other province except the Central Provinces and Berar. It is said that the increased prevalence of these diseases as compared with 1905 was largely due to conditions of scarcity and famine. In Ajmer-Merwara 564 deaths were attributed to dysentery and diarrhœa; and in Coorg 141 deaths were recorded under this heading.

General History of Vaccination.

(For Statistical Tables, *see* page 137.)

Vaccination in India.—The total number of operations performed by the Vaccination Department in 1906-07 was 9,080,303. This figure, although 197,593 less than the total of 1905-06, is considerably higher than the total of any of the preceding three years. The falling off in the number of operations in 1906-07 as compared with 1905-06 was shared by every province, except Madras, where there was an increase of 86,610 operations, and was greatest in Eastern Bengal and Assam, 110,994, and Burma, 59,275. The number of primary operations performed was 8,341,794, or 244,976 fewer than in 1905-06. In Madras alone was the number of these operations higher than in the previous year, and the increase of 80,179 in that province has to be set off against a decrease of 123,509 in Eastern Bengal and Assam, of 56,536 in Burma, of 30,401 in the Punjab, of 29,649 in Bengal, of 28,419 in the United Provinces and smaller numbers elsewhere. The total number of revaccinations was 738,509, or 47,383 more than in the previous year, all provinces except four sharing in the improvement, which was greatest in Bengal, 25,692, the Central Provinces and Berar, 16,406, and Eastern Bengal and Assam, 12,515. The four provinces in which the numbers of revaccinations were fewer than in 1905-06 were the Punjab, 13,119, Bombay, 7,843, Burma, 2,739, and Ajmer-Merwara, 298. The mean percentage of success in primary operations throughout India was 97·21 compared with 97·20 in the previous year, and the variation in the percentages of success in the provinces between 99·34 in the Punjab and 90·64 in Burma was nearly the same as in the previous year. Revaccinations succeeded at the rate of 72·85 per cent. compared with 74·20 in 1905-06, the percentages in the different provinces ranging from 84·43 in the United Provinces to 53·43 in Burma. The mean number of operations performed by each vaccinator was 1,432, or 48 less than in the previous year; and, as usual, there were great differences in the mean outturn per vaccinator in the different provinces, the extremes being 2,923 operations per vaccinator in the North-West Frontier Province and 807 in Ajmer-Merwara.

There was a further increase in the total number of persons vaccinated at dispensaries, the total in 1906-07 being 218,717 against 207,421 in the previous year; but the increase was confined to Bengal, 23,844, and Burma, 1,014; everywhere else there was a falling off. The ratio of successful vaccination per thousand of the census population, which had risen from 34·79 in 1904-05 to 36·39 in 1905-06, fell to 35·41, the ratios ranging from 54·58 in Coorg to 25·36 in Bombay and 24·79 in Ajmer-Merwara.

The proportion of children vaccinated was, of course, also lower than in 1905-06. Taking the census population of 1901, and estimating the number of births during the year at 40 per thousand of that population, the percentage successfully vaccinated was 42·62 of the total against 43·83 in the previous year, and 42·46 in 1904-05. The percentage rate of protection according to this very artificial calculation varied from 73·61 in the Central Provinces and Berar and 60·05 in the Punjab, to 18·58 in Burma and 12·72 in Coorg.

The total cost of the department was £89,671, compared with £85,509 in 1905-06, and the mean cost of each successful case rose from 2$\frac{1}{16}$d. in that year to 2$\frac{7}{16}$d. The highest rate was 9$\frac{1}{2}$d. in Bombay, and the lowest rates were 1$\frac{1}{8}$d. in the United Provinces, 1$\frac{5}{16}$d. in Bengal and 1$\frac{1}{2}$d. in Eastern Bengal and Assam.

Vaccine Depots.—In all provinces, except the Central Provinces, the North-West Frontier Province, Ajmer-Merwara and Coorg, there is a Central Vaccine Depot, more or less complete, for the manufacture of vaccine, and each of the presidency towns, except Madras, maintains a separate depot for its own requirements.

At Shillong the depot has been improved by extending the site and building a new operating room with marble flooring and walls. It is hoped that in the ensuing season it will be possible to supply the whole province with glycerinated lymph and discontinue arm-to-arm and calf-to-arm vaccination. At Patwa Dangar, in the United Provinces, owing to the increase of work in 1905-06 a considerable augmentation of establishment was sanctioned. A scheme for expanding the vaccine institute at Lahore has been sanctioned and will be carried out as soon as funds can be made available. The chloroformed glycerine lymph manufactured in the Punjab was used with the most satisfactory results in a large number of cases. In 152,080 primary operations the case success was 99·88 per cent. and the insertion success 98·72, and in 24,603 revaccinations the case success was 81·0 per cent. and the insertion success 80·16. The people of the

Punjab greatly prefer the use of tubed vaccine to the calf-to-arm process, because the results of the operation are less severe and the sores heal more quickly, and because their calves are no longer required as vaccinifers. The Institute continued to supply the North-West Frontier Province with vaccine. At Amraoti in Berar, great difficulty was experienced in obtaining a sufficient number of calves, and it is being considered whether it would not be well to close the depot and manufacture lymph at the head-quarters of each district as is done in the Central Provinces. In Bombay good progress was made in the substitution of glycerinated vaccine for calf and human lymph. A laboratory was added to the depot at Belgaum where the purity of each supply of lymph is tested before issue. In Burma on account of the high temperature on the plains, it is proposed to move the depot from Meiktila to Maymyo.

Bengal.—Of the total of 2,037,273 vaccination operations performed during the year, 1,874,976 were primary cases and 162,297 revaccinations. The former show a fall of 29,649 and the latter a rise of 25,692 compared with the figures of the preceding year; the net decrease being 3,957 cases. The reason for the smaller number of primary cases is said to be inability of the poorer classes to pay the prescribed fees owing to high prices of food grains. Of the 34 districts in the province there was an increase in the number of vaccinations in 13 and a decrease in 21. The larger increases occurred in the Tributary States (52,798), Darjeeling (24,846), and Murshidabad (22,716), and the larger decreases in Cuttack (15,451), and Jessore (10,581), while in Nadia, Howrah and Dar-Changa the fall in each exceeded seven thousand cases. The reasons for the decreases are peculiar to each district; and in some places a decrease was due to an unhealthy season. No adequate reason is assigned for the remarkable increase in the Tributary States, but a part is due to the inclusion of figures of the Sonpur State which were not included last year. In Darjeeling an outbreak of small-pox, and in Murshidabad the employment of a larger number of vaccinators and better supervision account for the results. The system of rewards to vaccinators has created a healthy stimulus and competition among the better class of men and is to be continued. The quality of work shows an improvement; in primary cases 99·24 per cent. were successful compared with 99·13 per cent. in 1905-06, and in revaccinations 70·40 per cent. compared with 66·29 per cent. Of the several classes of operators, the licensed men obtained the higher rate of success in primary cases, and paid vaccinators in revaccinations. The work done by vaccinators attached to municipalities, dispensaries, etc., increased from 122,105 to 145,949 cases; the primary cases which numbered 90,873 increased by 253 only, but the revaccinations increased by 23,591 to 55,076. The ratio of success was, however, lower, 97·85 against 98·38 per cent. in primary cases, and 56·66 against 65·17 per cent. in revaccinations.

The kinds of lymph used and the extent to which employed with the ratio of success in primary cases were as follows—the figures in brackets are the percentages of success during the preceding year:—Calf lymph 87,803 cases with 99·08 (98·92) per cent. successful, lanoline lymph 696,415 cases with 98·25 (96·57) per cent. successful, and human lymph by the arm-to-arm process 1,090,758 cases with 99·13 (99·21) per cent. successful. In revaccinations the ratio of success by each of the above methods was 66·73, 50·29 and 77·75 per cent., respectively, the corresponding rates in the previous year being 58·81, 53·98 and 78·02 per cent.

On an estimated birth-rate of 40 per thousand of population, 39·46 per cent. of the infants were protected compared with 39·18 per cent. in 1905-06. It is said that although the statistics furnished by illiterate vaccinators are not always reliable it may fairly be assumed that infant vaccination is making progress from year to year. In towns 87·29 per cent. of the number of available infants were successfully vaccinated, against 85·82 per cent. in the previous year.

No account has been given of the working of lymph depots. The depot at Darjeeling supplied the Nepal Darbar and the Sikkim and Bhutan States with 350, 1,381 and 335 grains of lymph, respectively, but the results obtained are not stated.

The cost of the department amounted to £11,549, excluding the figures of the Calcutta municipality and three Feudatory States in the Sambalpur district, the returns for which had not been furnished, or £1,028 more than in the preceding year: no explanation of the increased expenditure has been furnished. Each successful case cost $1\frac{5}{32}$d. against 1¼d. in 1905-06.

Eastern Bengal and Assam.—The total number of operations which numbered 1,429,026 in 1905-06, fell to 1,318,032 in 1906-07. The net decrease of 110,994 is represented by a decrease of 123,509 primary cases and an increase of 12,515 revaccinations. The smaller outturn of work in 1906-07 is attributed to unusual activity in the

department during the preceding year, but the amount of successful work done during 1906-07 shows 3,181 operations less than the average of the preceding quinquennium. Of the 28 districts 17 show a decrease compared with the work done during 1905-06 of which the largest occurred in Faridpur (30,753 cases) and in Chittagong (25,303), in both these districts, however, the work exceeded the average of the preceding five years. The decrease of 9,435 cases in the Dacca district marks the continuance of the progressive fall since 1904-05 and an enquiry is to be made into the cause. In the Rajshahi, Tipperah and Kamrup districts the work increased to the extent of 3,225, 7,739 and 5,080 operations, respectively. The quality of the work as a whole shows an improvement, the percentage of success in primary cases being 98·55 and in revaccinations 72·11 against rates of 98·28 and 71·71, respectively, in 1905-06. On tea-gardens 15,871 operations were performed, of which all, except 71, were primary cases with 98·28 per cent. successful, compared with 15,143 operations, of which 94 per cent. were successful the year before. Dispensary vaccination fell from a total of 27,735 cases in 1905-06 to 25,602 in 1906-07: the primary cases were fewer and the revaccinations more numerous than in the previous year, while the percentage of success in the former was almost the same, 97·89 and 97·84, in the two years and in the latter 86·08 against 74·64 in the preceding year. The provincial Sanitary Commissioner points out the undesirability of allowing the population of an area round a dispensary to be vaccinated by the Hospital Assistant and his Compounder and proposes placing such areas under the Vaccination Department.

The inspecting agency in Eastern Bengal was combined with that in Assam on the 1st April 1907 and the cadre is to be increased by 10 officers; steps have also been taken to improve the class of men appointed as inspecting officers. Inoculators are still to be found in parts of the province, but the conversion of some of them in the Cachar district into licensed vaccinators, and the extension to all districts of Act IV (B. C.) of 1865, prohibiting inoculation, ought soon to result in the disappearance of this operation.

On an estimated birth-rate of 40 per thousand of the population, 29·30 per cent. of the infant population were protected; and of the number of available children in the towns of the province 68·7 per cent. were successfully vaccinated, the corresponding percentages the previous year were 33·62 and 70·9, respectively.

The expensive and cumbersome vaccination from the calf has been discontinued except in the Dinajpur, Rajshahi and Bogra districts, and the use of humanized lymph, which has already been discontinued in areas where vaccination is compulsory (and is also if possible to be discontinued elsewhere) has been replaced by the introduction of glycerinated lymph from the Shillong depot. This description of lymph is much appreciated and the demand of the year exceeded the estimated consumption. A larger quantity will be prepared to meet all requirements. Lanoline paste was issued to some districts with unsatisfactory results and is not to be used in future. Certain improvements are being carried out at the Shillong depot which is to supply the whole province with vaccine; the quality of the vaccine issued during 1906-07 was uniformly reported to be excellent.

The cost of the department rose to £6,042 from £5,340 in 1905-06, and each successful case cost 1¼d. against 1 1/5d. in each of the two preceding years.

United Provinces—The quantity and quality of the work of the Vaccination Department in the United Provinces, except in the number of revaccinations, exhibits a falling off in 1906-07 compared with the preceding year. The total operations numbered 1,675,060 or 20,356 less than in 1905-06. Primary cases were fewer by 28,419 and revaccinations more numerous by 8,063 than in the preceding year. The percentage of success in primary work was 97·72 and in revaccinations 84·43, against 97·93 and 84·78, respectively, in 1905-06. The falling off occurred in the 1st Circle, there having been an increase in the 2nd Circle as a whole. The decline in the 1st Circle is partly attributed to local causes, but the provincial Sanitary Commissioner considers more supervision necessary which cannot be afforded while the Deputy Sanitary Commissioner of the Circle is also Chief Plague Officer. Arrangements have now been made to relieve the Deputy Sanitary Commissioner of such additional duties in future. There are 49 districts in the province of which 22 show an increase in the number of successful primary operations against 34 in the previous year. The largest increase was of 3,804 operations in Garhwal, and the largest decrease occurred in Jalaun (7,922), followed by Etawah (6,251), Hamirpur (5,997) and Agra (5,643). The causes of the decreases were good work in previous years which reduced the susceptible population, sickness among the people, etc.

On a hypothetical birth rate of 40 per thousand, 48·49 per cent., against 49·57 per cent. the year before, of the infants available were successfully vaccinated. In municipal towns 93·4 per cent. of the number available were protected.

Lymph depots were maintained at Lucknow and Patwa Dangar (Naini Tal). Pure calf lymph and lanoline lymph were both used, but the vast majority of operations were performed with glycerinated lymph. The working of the Patwa Dangar depot was satisfactory and the amount of work had so increased during the year 1905-06 as to necessitate a considerable increase to the subordinate staff which was sanctioned in October 1906. The cost of the depot was £383 including £77 for stores received from England, and as lymph of the value of about £233 was sold to Native States, municipalities and private individuals, the depot is largely self-supporting. All the material required to start the season's vaccination in every district, except Lucknow, was supplied from the depot. The credit of the successful working of the year is said to be due to the Deputy Sanitary Commissioner of the 2nd Circle.

The cost of the department in the province amounted to £10,065, against £10,216 in the year 1905-06, the decrease being due to the smaller expenditure at the Patwa Dangar depot for which fewer costly articles were imported. The cost of each successful case was 1½d. in both years.

Punjab.—The total number of vaccination operations during 1906-07 was 705,219, or 43,520 less than the number in the preceding year, when there had been an increase of 28,968 compared with the total of 1904-05. In 20 of the 29 districts there was a decrease in the amount of work done, and but for the notable increase of 22,514 cases in the Kangra district and considerable increases in the Lahore and Amritsar districts, the results would have been far more unsatisfactory. The districts of Multan (15,325), Ferozepur (14,575) and Dera Ghazi Khan (11,271) between them represent a fall of over 41,000 cases. The provincial Sanitary Commissioner attributes the smaller outturn of work to the fact that in the first half of the vaccinating season, October to December, malarial fevers were very prevalent in many districts, and in the second half, January to March, plague increased to such an extent as to interfere seriously with vaccination work. The Sanitary Commissioner adds that in very few instances were the deficiencies due to neglect on the part of the operating staff. The number of primary operations was 607,909 or 30,401 less than during 1905-06 with a percentage of success of 99·34 against 99·19, and there were 97,310 revaccinations or 13,119 less than during the preceding year, with a percentage of success of 78·12 against 83·38.

On an estimated birth rate of 40 per thousand, 60·05 per cent. of the infants were protected, compared with rates of 62·54 and 56·25 per cent. in 1905-06 and 1904-05. Of the available children under one year of age, 71·44 per cent. were successfully vaccinated in towns where the Vaccination Act is in force and 68·04 per cent. in towns where it is not in operation. The corresponding rates in 1905-06 were 85 and 66 per cent., respectively.

The results of the use of chloroformed glycerine vaccine continued to be most satisfactory. In 152,080 primary operations the average case success was ·99·88 and insertion success 98·72 per cent., while in 24,603 revaccinations the case success was 81·0 and insertion success, 80·16 per cent. The scheme for the expansion of the work of the central vaccine institute, with a view to supply vaccine in tubes to every district, has been sanctioned and is to be carried through as soon as funds can be made available.

The cost of the department was £6,640 or £127 more than during 1905-06, and each successful case cost 2 1/5 d. or ⅛d. more than in the preceding year.

Vaccination work in the large Native States, except those of Nabha and Jhind, showed a falling off compared with 1905-06. The following are the results—the figures in brackets are those for the preceding year, Patiala—primary cases 45,174 (54,086) revaccinations 24,832 (31,034): Bahawalpur—15,277 (18,804) and 46: Kapurthala—4,303 (5,578) and 97: Nabha—1,968 (1,074) and 11; Jhind—7,116 (6,978), (no revaccination) and Faridkote—3,119 (5,185) and 40. The quality of the work in primary cases ranged from a percentage of success of 87·59 in Nabha to 98·99 in Patiala, compared with the range of 89·77 in Nabha and 98·09 in Faridkote in the preceding year. In Patiala revaccinations succeeded at the rate of 77·75 per cent. and in the other States the numbers of revaccinations were insignificant.

North-West Frontier Province.—The total number of vaccination operations during the year 1906-07 was 91,893, or 8,973 less than in the preceding year, when there had been an increase of over 23,000 cases. The number of successful primary cases was

18,234 less and the successful revaccinations 1,424 more than in 1905-06, but the quality of work in the former was better—98·95 per cent. successful against 98·56 per cent., and the quality in the latter not quite so good, 83·67 against 84·45 per cent. In primary work all the districts except Peshawar, which shows an increase of 1,084 cases, exhibit a smaller outturn of work, the chief cause being the severe prevalence of fever during the greater part of the vaccinating season, while other causes, differing in character in the several districts, also affected vaccination. The local Administration suggest that a subsidiary cause may have been the absence of small-pox, and it may be noted that in the Peshawar district, where the vaccination work was better than in the previous year, there was a rise in the ratio of deaths due to that disease. The work in the Political Agencies increased by 2,538 cases in all. In the Kurram Valley there was an increase in primary cases, but a fall in revaccinations: in the Tochi Valley there was a slight decline in primary work and in the Shirani country both classes of work showed a decrease, while in the Chitral sub-agency and the Swat Valley no work was done, the reason for which has not been stated. The vaccinations at dispensaries amounted to 1,281 cases or less than half the number of 1905-06, and the quality of the work was poorer.

On an estimated birth-rate of 40 per thousand, 56·13 per cent. of the infants were successfully vaccinated, compared with 58·92 per cent. in 1905-06. In towns 85·9 per cent. of the available children under one year of age were protected against 72·3 per cent. in the preceding year.

Animal lymph was largely used in the settled districts of the province where there are facilities for obtaining buffalo calves. Vaseline lymph was used in less than a fifth of the total cases and human lymph chiefly in the Shirani country, and to a small extent in the Hazara and Bannu districts and the Kurram Valley. The percentage of success with animal lymph was 93·76 in primary cases and 80·99 in revaccinations; with vaseline lymph 92·61 and 65·85 and with human lymph 98·28 and 95·32, respectively.

A notable occurrence was the successful persuasion of three *mullahs* of Hangu to learn vaccination and it is hoped that in time they will give up inoculation.

The cost of the department amounted to £ 748 compared with £ 776 in 1905-06, but the cost of each successful case was 2½d or ½d more than in 1905-06.

Central Provinces and Berar.—In consequence of the prevalence of plague the total number of vaccination operations in the province, including dispensary vaccination and the operations in Feudatory States, fell to 617,381, or 8,757 less than in the year 1905-06. The primary operations numbered 525,977, a decrease of 25,163, and revaccinations 91,404, an increase of 16,406. The mean number of operations per vaccinator was 2,058, or 31 less than during the preceding year. The percentage of success was 98·56 in primary cases and 75·38 in revaccinations, compared with 98·59 and 72·30, respectively, in 1905-06. Excluding dispensaries and Feudatory States, there was a decrease of 28,492 primary operations in the districts, the most marked being in Jubbulpore (5,651), Wardha (4,984), Yeotmal (4,191) and six other districts with decreases ranging between 3,000 and 1,000 cases. The great falling off is attributed to, not only plague, but to cholera epidemics and to the withdrawal of vaccinators for duty in connection with these diseases, together with sickness among these men in common with the rest of the population. Still, it is satisfactory to note that six districts showed small increases, the highest being Buldana (1,013 cases). Revaccinations increased by 17,747, the largest rise occurring in Jubbulpore (4,392), while the largest decreases occurred in Saugor (2,865) and Amraoti (2,068). The increased number of revaccinations on the whole is due to special efforts made to revaccinate as many persons as possible owing to the severe outbreak of small-pox during the year. Dispensary work shows 19,162 primary cases against 24,064 in 1905-06 and 4,870 revaccinations against 4,726, but the quality of the work was better, 96·96 and 67·19 per cent. successful in primary cases and revaccinations, respectively, compared with 88·55 and 65·95 per cent. in 1905-06. In the Feudatory States primary cases numbered 64,334 against 56,103 in 1905-06, and revaccinations 5,483 against 6,968, with percentages of success of 97·71 and 84·29, respectively, in 1906-07, compared with percentages of 96·84 and 84·26 in 1905-06.

Estimating the birth-rate at 40 per thousand, 73·61 per cent. of the infant population, compared with 76·75 per cent. in the preceding year, were successfully vaccinated, and in municipalities 81·93 per cent. of the available number were protected against 96·93 per cent. in 1905-06.

The vast majority of the vaccination operations were performed with glycerinated lymph, fresh calf lymph being used in 10,246 cases and human lymph in 6,103 cases; with

lanolinated lymph only 383 operations were performed. The percentages of success with the different descriptions of lymph have not been stated. The Amraoti depot not being able to meet the full demand for the Berar districts, the Central Provinces system of preparing lymph in each district is likely to be introduced.

The cost of the provincial department was £3,999 or £109 less than during the preceding year, and the cost of each successful case 2d in both years. In the Feudatory States the cost was £352 or £35 more than in 1905-06, and the cost of each successful case also the same in both years, *viz.*, 1½d.

Madras.—The decrease of 18,279 vaccination operations which occurred during the year 1905-06 was more than made up during 1906-07, when, with an increase of 86,610 cases, the net total for the Presidency amounted to 1,551,600 cases. Primary cases and revaccinations numbered 1,437,924 and 113,676, against 1,357,745 and 107,245, respectively, during the preceding year, and of these the number successful were 1,296,673 primary cases against 1,222,602 in 1905-06 and 72,825 revaccinations against 78,710. The percentage of success in the former rose to 93·4 from 92·9 and in the latter it fell to 74·2 from 76·0. The increased amount of work is attributed to the impetus given by the prevalence of small-pox throughout the Presidency. The largest increases occurred in the North Arcot (20,415 cases) and Godavari (14,198) districts and in nine other districts the increases ranged between five and ten thousand cases. In two districts only, *viz.*, Tanjore and Chingleput, were decreases recorded and these are attributed in the former to the absence of vaccinators without substitutes, and in the latter to the smaller number of unprotected persons, and in both to the short supply of paste. The shortage of the paste supply was due to the failure of the contractor to supply a sufficient number of calves to the King Institute and to an outbreak of disease among those actually supplied, but measures have been taken to guard against a similar misfortune in future. The absence of vaccinators without substitutes will also be avoided by the maintenance of a reserve of operators by district boards. In municipalities 153,269 operations, or 14,312 less than in the preceding year, were performed. In Madras alone there was a fall of 15,744 operations, and in Negapatam and Trichinopoly decreases of over 1,000 cases each occurred, which are said in Madras and Negapatam to have been due to epidemics of small-pox in the preceding year when many people then sought protection in vaccination, and in Trichinopoly to the failure of the lymph supply and the carelessness of an operator. The total number of operations at dispensaries fell from 2,100 in 1905-06 to 248, and is accounted for by the orders issued in April 1905 by the local Government removing the responsibility of vaccination from medical officers.

On an estimated birth-rate of 40 per thousand, 31·92 per cent. of the infants were successfully vaccinated compared with 30·09 per cent. in 1905-06, and in municipalities 65·7 per cent. compared with 67·9 per cent. in the preceding year.

Lanoline lymph supplied by the King Institute was used in the vast majority of cases with a percentage success of 94·0 in local fund areas and of 95·9 in municipalities, and in the 193 cases performed with the same description of lymph supplied by the Bangalore Institute the percentage of success was 96·9. The glycerine lymph supplied by the King Institute was used in 11,708 cases and was practically a failure, as only 6·3 per cent. proved successful. The Corporation of Madras, with the sanction of the local Government, now uses animal lymph and no longer obtains vaccine paste from the King Institute.

The cost of the department showed a small increase, from £19,628 in 1905-06 to £19,659 in 1906-07, but the cost of each successful case fell to 3¼d or 1¼d less than last year.

Coorg.—Vaccinations numbered 10,884, or 6 more than in 1905-06. Primary vaccinations numbered 9,013 and revaccinations 1,871, the corresponding figures for the previous year being 9,047 and 1,831. The percentage of success in primary cases was 93·22, slightly lower than the year before when the rate was 93·30, and in revaccinations 75·54 compared with 76·11. Dispensary vaccinations fell from 413 to 348, the percentage of success in primary cases falling from 89·71 to 87·85, and in revaccinations from 78·26 to 72·22 in the two years 1905-06 and 1906-07, respectively.

The cost of the department was £183 1⅞ nearly the same as in the preceding year, and each successful case cost 4 1/12d which is 1/12d more than in the year before.

Bombay.—In 1905-06 the number of operations in Bombay was 12,669 less than in the preceding year, and in 1906-07, the total of 629,184 operations exhibits a further decline of 26,286. In the western registration district there was a decrease in the number of

persons primarily vaccinated which is attributed to the interruption of work by the deputation of vaccinators to classes of instruction in the use of preserved lymph; in the presidency circle there was a decrease in both primary cases and revaccinations, said to be due to the supply of lymph being interfered with owing to rinderpest among the calves and also to vaccination being interrupted by the extra work thrown on the staff in the preparation of glycerinated vaccine; in the Gujarat registration district there was a fall in both classes of work, the decrease in primary cases occurring in the Native States only, the reason assigned being the absence of the supervision that exists in British territory. The largest decrease in both primary cases and revaccinations occurred in the Sind registration district, the chief cause being the great prevalence of malarial fever among all classes. There was also a decrease in the Aden Settlement, the reason for which has not been stated. The total primary operations numbered 593,351 against 610,985, and revaccinations 37,510 against 45,353 during the previous year: the ratio of success was 95·93 per cent. in the former and 76·75 in the latter, compared with 97·56 and 76·13 per cent., respectively, in 1905-06. These figures include dispensary vaccination which numbered 325 primary cases and 1,180 revaccinations against 1,764 and 2,104, the corresponding figures for the preceding year, while the ratios of success were 84·16 and 54·22 per cent. for primary cases and revaccinations, respectively, compared with rates of 97·47 and 60·98 per cent., respectively, in 1905-06.

Estimating the birth-rate at 40 per thousand, 49·71 per cent. of the infant population were successfully vaccinated against 52·32 per cent. in the preceding year. The number of children actually vaccinated in towns exceeded the number calculated to be available, which is said to be due to children born outside the towns being vaccinated in them.

Good progress was made in the substitution of glycerinated vaccine for calf and human lymph and by the end of the year the use of preserved lymph had been introduced in all British districts excluding Sind. The depot at Belgaum supplies lymph to most of the vaccinators and that at Bombay to the local municipal establishment. A bacteriological laboratory has been added to the Belgaum depot, and the purity of every supply of vaccine is now tested before issue. In Sind calf lymph is used in Karachi town, and human lymph in all the districts. In the Presidency as a whole, human lymph, calf lymph, glycerinated lymph and lanoline lymph were used. The results with glycerine lymph are not yet as good as those with human and animal lymph, but the provincial Sanitary Commissioner notes that new methods, new material and new instruments require time before the best results can be obtained.

The cost of the department increased from £20,087 in 1905-06 to £21,742 in 1906-07, and in consequence of the larger expenditure and the smaller number of operations the cost of each successful case rose from 8¼d. to 9½d. The large increase under provincial funds is stated to be due to the increased pay of Deputy Sanitary Commissioners.

Burma.—The number of operations performed in Burma in 1906-07 was 411,131 or 60,289 fewer than in the preceding year. Primary cases decreased by 57,414 to 359,709 and revaccinations by 2,875 to 51,422. In primary work the ratios of success were practically the same in both years, *viz.*, 90·80 per cent. in 1905-06 and 90·65 in 1906-07, but in revaccinations the ratio fell from 53·25 per cent. to 52·39. The decline in the work of the department is said to be due not to apathy on the part of the officers concerned, but largely to the presence of plague, as there was proof that the people were confusing vaccination with inoculation against plague. In localities not affected by the plague scare there was evidence of increased work. At dispensaries 18,521 operations in all were performed or 1,014 more than in 1905-06. The percentage of success in primary cases fell to 90·12 from 90·44, but in revaccinations it rose to 59·34 from 53·78 in the preceding year.

Estimating the birth-rate at 40 per thousand, 18·58 per cent. of the children were successfully vaccinated compared with 21·27 per cent. the year before. The statistics of the children available in towns and the number vaccinated show that the latter exceeds the former, owing to children being brought into the towns for vaccination.

Vaccine lymph continued to be manufactured at the Meiktila depot for the whole province except Rangoon. In addition to recognized difficulties due to high temperature in certain months, the lanoline supplied to the depot was unsatisfactory and in consequence a large proportion of the issues were of glycerinated lymph. Lanoline is, however, held locally to be the best medium to preserve the vitality of the lymph in tropical conditions, and arrangements have been made to obtain a better quality. Proposals have

been made to open a vaccine institute at Maymyo where the disadvantage of a high temperature at certain seasons of the year will be avoided. After a series of experiments at the Meiktila depot Major Entrican decided to discard the use of chloroform in purifying lymph for ordinary purposes. The vaccine depot at Rangoon is reported to be so ill-fitted as to render the successful manufacture of vaccine difficult, but the local municipal authorities are expected soon to realize the necesssity for constructing and equipping a suitable depot for the lymph supply of the town.

The cost of the department rose from £7,631 in 1905-06 to £8,502 in 1906-07, and of each successful case from 4¾d. to 6 15/16d. The increased expenditure is attributed to the cost of educating native superintendents of vaccination and improving the equipment of the Meiktila vaccine depot, and this with the smaller number of vaccination operations, resulted in the higher cost of each successful case.

Ajmer-Merwara.—The total number of operations which had been 14,935 in 1905-06 fell to 12,100 in 1906-07. Of the total the primary cases numbered 11,973 and revaccinations 127, against 14,510 and 425, respectively, in the preceding year. The percentage of success however showed an improvement compared with the preceding year: in primary cases 97·87 per cent. proved successful against 95·50 per cent., and in revaccinations 82·68 per cent. against 81·65 per cent. There was no dispensary vaccination in the province.

The cost of the department was £191 as compared with £190, and the cost of each successful case 3 3/6d. against 3 1/12d. in the preceding year.

The conditions of service of vaccinators.—In November 1906 the Government of India considered the question of the position of vaccinators who, although employed by municipalities, local bodies and cantonments, were entitled to pensions or gratuities from the general revenues. They decided that vaccinators should be placed on the same footing as other local fund employés, and accordingly directed, in Home Department Resolution No. 190-202 (Municipalities), dated 27th November 1906, that—

(1) for the future vaccinators shall not be enrolled as servants of Government or employed as a provincial establishment;

(2) vaccinators employed hereafter by local bodies shall be wholly under their administrative control, and shall be on the same footing as other local employés; and that

(3) existing incumbents shall retain existing rights to pension from Government.

The effect of these orders cannot of course be gauged at present, but with the beginning of an altered system of recruitment a record of the present position in respect of the recruitment, employment, etc., of vaccinators is of interest The statement on the following pages shows conveniently the number of vaccinators working in the several provinces, by whom they are employed, how they are supervised, their rates of pay, the area in which they are required to work, and how they are employed in the non-vaccinating season.

Statement showing the conditions of employment of vaccinators in the different provinces of India.

Province.	Employed by	Number. 1st class.	2nd class.	3rd class.	Total.	Pay. 1st class.	2nd class.	3rd class.	Total.	Pensionable or Non-pensionable.	Area within which a vaccinator is required to work.	How employed during the non-vaccination season.	Supervision exercised.
						£	£	£	£		Square miles.		
Bengal ...	State ...	...	...	...	15	...	...	...	16s.—£2 s. d. 10 8—£1	Non-pensionable†	...	Vaccinators in municipalities are generally entertained for periods ranging from 3 to 6 months. When entertained during the non-vaccination season they are employed in connection with the stamping out of outbreaks of small-pox, and are given an allowance of four pence a day.	Supervised by Inspectors of Vaccination, Deputy Sanitary Commissioner and the Civil Surgeon.
	Local bodies	...	...	...	209	...	...	...					
	Licensed ...	...	...	...	1,421	...	...	...	Paid at the rate of two pence for each successful case.	...	75 ...		
Eastern Bengal and Assam.	State ...	...	...	...	31	...	...	...	s. £ s. d. 16—1 6 8 s. d. £ s. d. s. 10 8—1 & 13 4—16	Pensionable ...	851	No regular employment. The proposal to employ Municipal vaccinators in collecting vital statistics in compulsory areas is under consideration.	Each Sub-Inspector is responsible to the Civil Surgeon for the work of the vaccinators within his circle, he has to inspect about 60 to 70 per cent. of the operations performed and submits a monthly report of operations to the Civil Surgeon. The District Inspector helps the Civil Surgeon in compiling monthly returns and inspects about 40 per cent. of cases. The Civil Surgeon and Deputy Sanitary Commissioner also inspect the work when on tour.
	Local bodies	...	...	...	239	...	...	...		Non-pensionable	51		
	Licensed ...	...	...	...	971	...	...	...	Paid by fees at two pence for each successful case.	...	45		
United Provinces.	State ...	...	...	...	924	s. d. ‡13 4	s. d. ‡10 8	s. 18	...	Pensionable ...	116	On sanitary and registration work, for the distribution of medicines in times of epidemics or of relief in times of scarcity, for checking vital statistics, or assisting in carrying out minor sanitary improvements in villages. When so employed they are given in addition to pay an allowance of 6s 8d. per mensem.	The Province is divided into two Circles, each circle is under the superintendence of a Deputy Sanitary Commissioner and each district is under the direct supervision of the Civil Surgeon assisted by an Assistant Superintendent of Vaccination, except in the case of a few districts where the supervision is exercised by a Senior Assistant Superintendent of Vaccination.
	Local bodies									Non-pensionable	...		

Punjab ...	District Staff	14	32	70	§244	£ 1 6 8	£ 1 0 0	£ 0 16 0	...	Pensionable ...	Square miles. 368	Vaccinators during the non-vaccination season are employed in checking birth and death registers and preparing lists of children for revaccination in the following winter. A certain number are sent to Sadr dispensaries to be taught the compounding of medicines and the doses and uses of simple drugs, and also to dress simple wounds and to perform such minor operations as the opening of abscesses. They also distribute quinine in districts where malarial fevers are prevalent. On cholera epidemics they are employed for distributing medicines, etc.	The work of vaccinators is inspected by Superintendents of Vaccination, Divisional Inspectors, Civil Surgeons, and the Deputy Sanitary Commissioner, and the Sanitary Commissioner in the course of his tours also inspects the work.
	Special Staff	2	7	8	17	1 9 4	1 2 8	0 18 8	...	,, ...	...		
	Cantonments	...	...	...	8	...	...	...	...	,, ...	...		
North-West Frontier Province.	State ...	2	5	6	34‖	1 6 8	1 0 0	0 16 0	...	Pensionable ...	442 ...	In inspecting birth and death registers and in receiving instruction at the Sadr station in the use of a few simple drugs.	The work is under the immediate supervision of native supervisors and Divisional Inspectors, but a great portion of the work is inspected by Civil Surgeons and occasionally by the Administrative Medical Officer when on tour.
	Local bodies												
Central Provinces and Berar.	State ...	49	77	96	247(a)	1 0 0	0 16 0	0 13 4	...	Pensionable ...	437 ... (25 for municipal or cantonment vaccinator.)	On duties connected with outbreaks of epidemic disease. When not so employed their services are available for medical or sanitary work as the Civil Surgeon may think fit.	The work of the vaccination staff is supervised by native Superintendents of Vaccination and by the Civil Surgeon of the district under the supreme control of the Sanitary Commissioner.
	Local bodies	...	...	...	26	...	...	...	...	Non-pensionable...			
Madras ...	State ...	...	...	...	859(b)	£ s. d. 1 6 8	0 13 4	0 6 8	...	Non-pensionable	94 ...	No recess period	The work is supervised by Deputy Inspectors of Vaccination who are Government servants appointed and controlled by the Sanitary Commissioner, and are required to verify not less than 50 per cent. of the operations performed.
	Local bodies						0 16 0	0 9 4					
Coorg ...	State ...	...	...	...	6	...	...	...	1	Pensionable(c) ...	91 to 421	Vaccinators remain at head-quarters and perform what operations they can.	The Civil Surgeon is the Superintendent of Vaccination and verifies cases when on tour. During the touring season the Inspector verifies vaccination work and submits fortnightly returns.
	Local bodies	...	...	...	2	...	...	...	1	Non-pensionable	2—5		
Bombay ...	State ...	...	...	...	351	1-12-0	1-4-0	0-13-8	...	Pensionable ...	322 ...	There is no non-vaccinating season, but the work is less during the monsoon months.	The supervising staff comprises 5 Deputy Sanitary Commissioners, 31 Inspectors who are also Divisory Sanitary Inspectors. There is at least one Inspector to each Collectorate and two or more for the larger Collectorates. Each Inspector is able to see some if not all his vaccinators twice a year.
	Local bodies												

* Excluding Calcutta Municipality.

† Except those in Darjeeling and Sambalpur; future incumbents will be treated as Local Fund employés and will not be entitled to pension.

‡ Vaccinators employed in certain municipalities and cantonments are granted by the Local Bodies concerned a small extra local allowance.

§ Including 128 of the 4th grade at 13s. 4d. each. The men of the special staff are provincial vaccinators and are paid from the provincial funds; those employed in Cantonments are paid from Cantonment funds. The District Staff vaccinators are employed locally and paid from municipal and district funds, but are enrolled as servants of the State and admitted to the benefits of pension, etc.

‖ Including 20 of the 4th grade at 13s. 4d. each.

(a) Including 25 apprentice vaccinators at 10s 8d. each per mensem.

(b) In addition, 4 vaccinators are employed in Zamindaries, 6 in Cantonments and 18 in Agency Tracts; the services of men in Agency Tracts and Cantonments are pensionable.

(c) As vacancies occur, they will be filled by men employed by the Local Fund Board.

Statement showing the conditions of employment of vaccinators in the different provinces of India—contd.

Province.	Employed by	Number.				Pay.				Pensionable or Non-pensionable.	Area within which a vaccinator is required to work.	How employed during the non-vaccination season.	Supervision exercised.
		1st class.	2nd class.	3rd class.	Total.	1st class.	2nd class.	3rd class.	Total.				
Burma	State ...	...	...	...	Not fixed	...	...	...	£ s. d. £ s. d.* 1 6 8	Pensionable ...	Not fixed: usually corresponds in size with the township concerned.	No period for cessation of vaccination work; arrangements are being made to cease it for one month during the year, when vaccinators will be deputed to sell quinine, to perform mosquito brigade work, or other duty according to local requirements.	Civil Surgeons are *ex-officio* Superintendents of Vaccination and are responsible for the management of the staff and outturn of work in their respective districts. Native Superintendents (25) of Vaccination have been appointed for inspection work.
	Local bodies	...	...	...	"	...	...	...	...	Non-pensionable			

*Higher rates are given in a few specially unhealthy localities.

Sanitary works.

Bengal.—The number of municipalities in Bengal, excluding Calcutta, in 1905-06 was 128, and their income during the year, excluding the opening balance of £50,570, was £331,142 or £9,279 more than in 1904-05. The total sum available was £381,712 and of this 38·63 per cent. was spent on sanitary works, of which 7·42 per cent. was spent on the treatment of the sick, 8·76 per cent. on roads, 5·19 per cent. on public safety and 30·96 per cent. on other requirements. The actual sums spent on sanitary works were as follow—on water-supply £16,537 or £1,013 less than in the previous year; on drainage £10,671 or £938 less than in the previous year, the decrease in both cases being due to smaller capital expenditure; on conservancy £78,600 or £4,698 more than in 1904-05; while smaller sums were spent on markets, and slaughter-houses, vaccination, the disposal of the dead, etc.

The improvement of the conservancy in the towns of Bengal continues to make progress and expenditure under this head rose nearly everywhere. Almost every town has now a properly laid out trenching ground and most of these are regularly cultivated. Rules for the management of the septic tank installations at factories have been published and instructions were issued from the office of the Sanitary Commissioner to all inspecting officers specifying the details of inspection to be made by them of these installations. Several of the District Boards undertook the sanitary improvement of villages, notably in the Patna district, where 181 villages were cleansed on the lines laid down by the Board at a cost of £167.

Sanitary Board.—There were four meetings of the Sanitary Board during the year, at which the following were the principal subjects of discussion—

(1) rules for the preparation of water-supply and drainage projects;
(2) the employment of a permanent staff of surveyors for the preparation of sanitary schemes;
(3) the preparation of a drainage scheme for the Berhampore municipality; and
(4) a proposal to treat the Darjeeling water-supply with ozone.

Preliminary estimates were prepared for the following schemes—

Gaya water works.—It is proposed to sink wells on the bank of the river Phalgu. The estimate, which amounts to £42,000, is being considered by the local authorities.

Patna drain-flushing scheme.—It is proposed to have a central pumping station at Babuaganj *ghat*; the cost of the scheme is £7,033.

Jessore water-works.—Borings are being made to ascertain whether a sufficient supply of water can be obtained from the bed of the Bhairab.

Detailed estimates were prepared for the following—

The Khulna water-works.—The cost of the scheme was reduced to £1,189. It provides for a supply of 15,000 gallons of filtered water a day delivered into five existing reservoirs. The water is raised from a reserved tank by means of a pulsometer pump with two sand filters, whence it flows in pipes to the reservoirs from which the people draw off the water. The works were opened in October 1906.

Bhagalpore water-works, remodelling.—The scheme, which will cost about £8,067, comprises a remodelled intake from the Ganges, and an installation of Diesel oil-engines for pumping.

The Darjeeling water-works.—The Pasteur-Chamberland system having proved a failure, it has been resolved to convert the existing settling tanks into sand filters.

Monghyr water-works.—A scheme to obtain water direct from the Ganges at a cost of £31,267 was sanctioned and the work was nearly finished at the end of the year.

The municipalities of Arrah, Bankura, Berhampur Bettiah, Bhagalpur, Garden Reach, Jessore, Murshidabad, Midnapore, Baruipur and North Barrackpur, each appointed a surveying staff for the preparation of surface drainage schemes. Drainage schemes for Suri, Serampur and part of Hooghly-Chinsura were drawn up, and good progress was made in the towns of Burdwan, Monghyr, Kalna and Katwa. The Hazaribagh municipality entrusted the execution of their drainage scheme to a contractor.

The following schemes among others were considered during the year—The Cossipur-Chitpur unfiltered water-supply; the Serampur filtered water-supply; the extension of filtered water-supply to Tollygunge; the Kurseong water-supply improvement; the Maniktollah water-supply; the Bagjollah drainage scheme; and drainage schemes for Baranagore, Cuttack, Baraset, Uttarpara, Titaghar and Howrah (Block IV).

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Eastern Bengal and Assam.—The aggregate income of the 44 municipalities in 1905-06, including opening balances, was £100,634 of which 42·12 per cent. was spent on sanitary works and sanitation, including treatment of the sick and the construction of roads, the actual sums spent under the principal headings being £5,143 on water-supply; £3,041 on drainage; £24,211 on conservancy; £1,562 on markets and slaughter-houses; £9,704 on the treatment of the sick; and £14,294 on the construction of roads, the amount under each heading in all cases, except treatment of the sick, being considerably larger than in 1904-05.

The towns of Gauhati, Silchar, Dibrugarh, Faridpur, Mymensingh and Pabna spent the largest proportion of their respective incomes on sanitation, in each case over 50 per cent.; the towns of Sylhet, Noakhali, Comilla, Rangpur and Dacca spent between 40 and 50 per cent., and Chittagong spent 28·13 per cent.

Many of the District and Local Boards are beginning to spend a larger percentage of their income on sanitation, and there is reported to be a growing feeling among them that Sanitary Inspectors should be appointed to bring them more in touch with the requirements of the districts and to aid in dealing with outbreaks of epidemic disease.

In many of the larger towns of the province schemes for water-supplies and drainage are under consideration, and the improvement of conservancy and the construction or improvement of market buildings are receiving attention.

At Dacca a scheme for improving and extending the existing water-supply is under consideration, and plans and levels have been prepared in connection with a drainage project. A new slaughter-house is in course of construction and proposals have been brought forward for the construction of a municipal market.

At Chittagong two alternative schemes for a water-supply have been brought forward: one scheme provides for the construction of a reservoir by damming a stream among the hills near the town; the other provides for obtaining water from springs near the railway station.

At Narayanganj a project to supply the inhabitants on the western bank of the river Lakhia with water from that river at a cost of £11,133 is being carried out, and a surface drainage scheme to cost £933 is being prepared.

At Barisal a water-supply project to supply water from the river at a cost of £13,800 has been temporarily shelved for want of funds, but it is hoped that it will soon be taken up.

At Dinajpur a drainage scheme has been completed as far as possible at present, and a further scheme to canalise the Ghagra and Kachai rivers where they pass through the town is being considered by the Municipality and District Board.

At Gauhati a new pump has been installed at the water-works; and the building of the new municipal market is well advanced.

Projects for improving the water-supply of Chandpur, Rampur-Boalia, Sibsagar, Silchar and Jorhat are under consideration, and surface drainage schemes for English Bazar, Mymensingh, Comilla, Gauhati and Silchar are in various stages of preparation.

Sanitary Board.—Five meetings of the Board were held during the year, at which the following were the principal subjects of discussion—

(*i*) *The drainage of unhealthy areas.*—Steps were taken to obtain information concerning unhealthy tracts in the Faridpur, Dinajpur, Rangpur and Rajshahi districts with a view to taking special measures for their improvement. A scheme for the improvement of the Nator sub-division of the Rajshahi district is being drawn up by the District Engineer.

(*ii*) *Improvement of water-supplies in rural areas.*—A sum of £1,467 was placed at the disposal of the Board by the local Government to be distributed as grants-in-aid to the various District and Local Boards on the conditions that the Local Board and the people of the locality would each contribute a sum equivalent to the grant, and that legal guarantees should be given that the water in the wells or tanks constructed with the money should be reserved for drinking purposes. In some districts the invitation of the Sanitary Board for applications was eagerly accepted, notably in Kamrup and Dinajpur; from the former district alone applications for more than half the total allotment were made.

(*iii*) An enquiry into the condition of the country near Bogra which was said to have become unhealthy through the silting up of the river Karatoya. The re-excavation of the river was found to be impossible; but it seems there is no evidence that the area in question is particularly malarious.

(iv) The appointment of a Sanitary Engineer for the province. An application for a whole-time Sanitary Engineer was made to the local Government. The creation of the appointment has been approved by the Government of India.

United Provinces.—The municipal towns in these provinces spent in 1905-06 about 44 per cent. of their total income on conservancy, plague-prevention, water-supply and drainage; the actual expenditure was on water-supply works £3,485 and on drainage and sewerage £73,147. The rapid progress made in the development of municipal sanitation may be gauged from the fact that the cost of the projects of improvement considered by the Sanitary Board was about 38 per cent. more than in the previous year. The water-supply works at Agra, Allahabad, Benares, Cawnpore, Lucknow and Meerut worked well throughout the year; there was in each instance a considerable increase in the quantity of water supplied, many pipe extensions were made, and the numbers of house connections continue to rise. At Naini Tal the water-works gave satisfaction throughout the year; and at Mussoorie the large hydro-electric scheme for extending the water-works and providing electric light in Mussoorie and Landour made good progress and is expected to be completed by March 1908.

At Agra 15 more lanes were paved and drained and the length of drains flushed has risen to 42½ miles. At Allahabad a large drainage scheme is in preparation, in connection with which an engine and disintegrator were purchased during the year. Many stone-flag drains were laid and 46,000 square feet of city lanes paved. At Benares the sewerage scheme has been completed at a cost of £88,802 and a further scheme estimated to cost £138,197 for the sewerage and surface drainage of the rest of the city has been sanctioned and will be carried out as funds become available. At Cawnpore the sewerage scheme worked satisfactorily, and estimates and plans for the surface drainage and paving of the city were prepared. At Lucknow progress was made with the surface drainage and paving and after some discouraging results, satisfactory results are being obtained with the plant for the biological treatment of sullage which on account of its extreme concentration (446·0 parts of suspended solids per 100,000) presents unusual difficulties.

Drainage works were completed in Dehra Dun, Chandausi, Fategarh and Mirzapur; and were nearing completion in Deoband and Nagina. Projects for the drainage of Hathras, Budaun, Moradabad, Hapur, Saharanpur, Bahraich Jaunpur, Fyzabad, Ujhaini and Muttra-Brindaban were either completed or nearly completed; and surveys were in progress in Amroha, Etawah, Gorakhpur, Mainpuri and Sambhal.

The appointment of an Assistant Engineer was sanctioned, and Mr. Parker, who was selected, joined his appointment in January 1907.

Sanitary Board.—There were four meetings of the Board during the year, at which the members considered, criticized and approved projects estimated to cost £172,728 to most of which reference has already been made. The reports on the working of the Village Sanitation Act in 1904-05 were read, and it was noted with satisfaction that the expenditure on village sanitation which amounted to £6,881 was greater than in any former year.

Punjab.—No details regarding municipal funds or of the proportion of income devoted to sanitary works are contained in the provincial report. At Lahore estimates have been made and financial arrangements are being considered for improving the water-supply by the addition of a third engine and another series of wells. The construction of the conservancy tramway line was nearing completion. At Delhi the urgent necessity for an extra engine, pumps, filter beds, and sedimentation tank at a cost of about £12,867 has been brought to the notice of the Municipal Committee. The intramural drainage construction made good progress. At Amritsar estimates for remodelling the street drains in several more of the city wards were prepared; and it was decided to raise the sullage by means of centrifugal pumps from two collecting tanks at the surface on to land. At Ambala grants-in-aid aggregating £1,000 were sanctioned for the extension of intramural drains. At Rawalpindi the construction of the main intercepting drain and disposal works estimated to cost £9,264 was nearly completed, and the preparation of a project of intramural drainage was taken in hand. At Multan the construction of the main drain and disposal works to cost £4,879 was nearly finished. The drainage works at Jagraon and Gujarat were completed. At Ludhiana a detailed estimate amounting to £28,698 for the water-works scheme was sanctioned and work was begun in September. At Sargodha the water-works, estimated to cost £8,151 and the drainage works of the city and civil station, estimated to cost £6,067 were completed.

The Sanitary Engineer notes that there still remains much to be desired in the working of the sewage farms, but the Sanitary Commissioner draws attention to the increase in the area of land taken up for sullage irrigation in the vicinity of many of the towns and to the increased price being paid for municipal sullage. The amount realized from the sale of manure by the municipal towns was £10,650 compared with £10,125 in 1905.

A few District Boards offered rewards for the best results shown in the sanitary improvement of villages, but as usual they were not bestowed as the interests of village communities in sanitation is not yet awakened.

Sanitary Board.—There were five meetings of the Sanitary Board during the year. The Board distributed grants-in-aid aggregating £2,000 to a large number of the smaller towns for sanitary works; and advised regarding most of the projects mentioned above.

The appointment of provincial Sanitary Engineer was made a permanent one.

North West Frontier Province.—Progress in sanitation in this province was confined to minor improvements in the water-supplies, drainage and conservancy of the towns, and to the cleaning out of wells in the district. There was a trifling increase in the sum derived from the sale of manure by municipalities, the aggregate receipts rising from £1,452 in 1905 to £1,457, and it appears that if more attention was paid to this source of income the sum realized would be considerably increased.

Central Provinces and Berar.—The income of the district head-quarters municipalities in 1906, excluding opening balances and special grants, was £86,468 or £1,769 less than in the previous year. Of the total income 39·49 per cent. (against 34·24 in 1905) was spent on water-supply, drainage, conservancy (21·04 per cent. of total income), markets, slaughter-houses and other sanitary requirements; 4·27 per cent. on medical relief; 1·21 per cent. on plague and 0·17 per cent. on vaccination.

No original work of capital importance was undertaken during the year, but in most of the towns considerable activity was displayed in improving water-supplies, extending and renewing drains, etc.

Sanitary Board.—Meetings of the Sanitary Board were held at all district head-quarters, except Akola, Hoshangabad and Nagpur. The work carried on under their direction consisted as usual in the improvement of existing wells, the construction of new wells, the repair of roads and the clearing of village sites.

A letter was sent by the local administration to the Government of India in which the urgent necessity for the appointment of a provincial Sanitary Engineer to carry out schemes of sanitary improvement in the larger towns was represented.

Madras.—No details of municipal income or of the proportion expended on sanitation are furnished in the provincial report from which, however, it appears that the assignment made for sanitation during 1906 was smaller than in the previous year, but a larger proportion was actually spent, although with the single exception of Bimlipatam, where it was exceeded, in no town was the allotment fully utilized, and in eight towns the expenditure was 50 per cent. below the sanctioned amount.

The extension of the Coonoor water-works, and the erection of a pumping installation at the Arisipalyam tank in Salem were completed under the direction of the Sanitary Engineer. The improvement of the head-works of the Guntur water-supply, the drainage works of Ootacamund, and the head-works of the Saidapet water-supply scheme, which was held in abeyance pending the settlement of a claim made by the authorities of the cantonment of St. Thomas' Mount to certain land, were under construction. The Vellore, Gudiyattam and Nellore water-works were being constructed by the Public Works Department. A comprehensive scheme for the drainage of Madura, and plans and estimates for the water-supply of Berhampur, Periyakulam Tuticorin (filter-beds and pumping plant), and Tanjore extension were prepared by the Sanitary Engineer. A report containing proposals for the improvement of the drainage of the City of Madras was forwarded to Government, the proposals were sanctioned, and the President of the Corporation was requested to have plans and estimates prepared.

Sanitary Board.—The Sanitary Board reviewed a large number of schemes the aggregate cost of which was £402,627. Of the schemes, 39 costing £397 645 were for Municipalities and 27 costing £ 4,982 were for local Fund Boards. The most important of the schemes were, Madras water-supply (improvements), £150,000, Ootacamund drainage, £25,535; Coimbatore water-supply, £30,000, Madras hospital for infectious diseases, £7,644, Tuticorin water-supply, £19,279, Madras

drainage (improvements), £38,625, and Madura drainage, £90,929. Final approval was accorded to the plans and estimates of 31 works costing £5,975.

Bombay.—The income of the 162 municipalities in the districts of Bombay in the year 1905-06 was £466,596 of which £149,032 or 31·94 per cent. was spent upon water-supplies, drainage and conservancy. There were 24 District Local Boards with 210 *Taluka* Local Boards, of which the aggregate income was £379,006 and a sum of £26,325 or 6·95 per cent. of income was expended by them on water-supply and drainage.

Progress in municipal sanitation in the Bombay Presidency has been hampered by the ravages of plague which have embarrassed the financial position of most municipalities to such an extent that many urgent schemes for water-supply and drainage have had to be deferred.

Sanitary Board.—The Board met twice during the year, when the following among other matters were considered—

(1) Surveys for the improvement of the water-supply and drainage of the towns in the neighbourhood of Bombay City.

(2) The collection of information regarding municipal water-supply and drainage works with a view to obtain a record of such works in the Presidency. The information collected by means of a circular addressed to all municipalities was abstracted by the Sanitary Engineer and forms an admirably concise account of the progress made in municipal sanitation in the Bombay Presidency. It is published in the provincial Sanitary Report for 1906.

Three important works were in progress during the year—

The Ahmedabad drainage and sewerage scheme.—The extension of the scheme undertaken by the municipality in 1903 was completed at a cost of £93,535 for which they have sewered 500 acres of the city populated by about 90,000 persons. The municipality are arranging to extend operations on their sewage farm, and to develop their resources before beginning a further extension of the scheme.

Karachi drainage.—Extensions of the Shone system were in progress and the original scheme cost £40,000 for a population of 30,000. Another £36,667 have been sanctioned to extend the system to a total population of 44,564.

The Jalgaon water-supply.—The water-supply is derived from two tanks situated about 3 miles to the south of the town. The lower tank serves as a pure water reservoir; the upper tank, which was built in 1878 to supplement the supply of the lower, is leaky and frequently runs dry. The improvements include a feeder channel to augment the supply in the upper tank, a balancing tank, a new 13-inch service main to replace the existing 5½-inch main, and improvements in the distribution system; the cost is estimated at £11,393.

The following projects were sanctioned—

Improvements to the Dhulia water-works.—The expenditure of £2,545 was sanctioned to provide new filter-beds.

Pandharpur drainage.—The project for a complete drainage system, which includes a main collecting sewer to intercept the sewage which has hitherto found its way into the river, in which thousands of pilgrims wash and bathe and from which many of them obtain their drinking water, is estimated to cost £13,377.

Projects were prepared during the year for the Poona and Kirkee water-supply (£105,615) and the drainage of Poona (£149,025). A considerable number of new works and improvements to existing works were considered, including extension and improvement of the Ahmedabad water-supply; improvement of the Surat water-supply; a drainage scheme for Surat; Kurla water-supply; improvement of the Pandharpur water-supply; improvement of the Hyderabad water-supply; improvement of the Sukkur water-supply; improvement of the Ahmednagar water-supply; and the provision of new water-supplies for Nasik, Kapadvanj and Dakor.

Burma.—The total income of the towns in Burma in 1906 was £528,534 of which £274,453 were spent on sanitary works as follows—on water-supply £ 83,672; on drainage £57,245; on conservancy £69,793 and on other sanitary works £63,743.

At Rangoon the Hlawga water-supply scheme, estimated to cost £308,873 was completed and handed over to the municipality on the 1st July. A supplementary estimate of £9,511 was sanctioned for special repairs to the dams, and part of this work was finished.

The cantonment water-supply scheme was completed. The reclamation of land continues, but the improved building bye-laws were still under consideration of the Municipal Committee.

At Akyab the water-supply project was in progress and the estimates were slightly amended to admit of certain improvements.

At Insein plans and surveys for a drainage scheme were prepared by the Sanitary Engineer and handed over to the Executive Engineer of the district so that detailed estimates and plans might be prepared for sanction. At Pegu plans and estimates (£3,421) for a drainage scheme were prepared. At Mandalay water-supply schemes continue to be discussed. In several other towns plans and estimates for water-supply and drainage schemes were prepared.

The income of the District Municipalities in 1906 was £297,585 of which £21,373 were devoted to sanitary works, distributed as follows—on water-supply £4,669, on drainage £2,505; on conservancy £4,806; and on other sanitary works £9,393.

Sanitary Board.—The Board met four times during the year—three times in Rangoon and once in Mandalay. At the second meeting the Board approved of the amended rules for the guidance of the Sanitary Engineer in respect of sanitary works and recommended their adoption. At the third meeting the water-supply of Mandalay was discussed as the accepted scheme for tube wells was not considered in all respects satisfactory. It was resolved that the municipality should be asked to decide what is the largest sum which they can afford to pay for a water-supply, and that for comparison with the present scheme the following sources of supply should be considered and rough estimates framed for the different projects—a reservoir in the hills with a supply by gravitation; deep wells in the north of the town; the river.

General Remarks.

Red Sea Pilgrim Traffic.—The pilgrim season of 1905-06 was the last for which the segregation of pilgrims for five days at Bombay, prior to embarkation, was enforced. The conditions on which pilgrimage from India to the Hejáz is now permitted were detailed on page 119 of this abstract for 1905-06.

According to the report by the Superintendent of the Preventive Service, Bombay, the segregation Camp at Pir Pao was opened on the 7th October 1905, and the first batch of pilgrims sailed from Bombay on the 14th of that month. In all 18,390 pilgrims left Bombay in 23 ships, the last sailing on the 9th of January 1906. The report of the British Vice-Consul at Kamaran records the arrival of 24 ships from Bombay with a total of 18,745 pilgrims of whom 15,203 are described as Indians. The Vice-Consul has included in his return the S. S. "Clan Sinclair" which arrived at Kamaran on the 15th of October 1905 with 257 pilgrims; this ship is not included in the return of the Bombay authorities, presumably because it sailed before the recognised pilgrimage season. According to the Indian reports there was an increase of 6,097 pilgrims during the season 1905-06 as compared with the previous one, but the Kamaran report records an increase of 3,801 only; this difference may be due to the fact that the Kamaran report, and also the Haj report, distinguish between Indians and Afghans, while the Indian report makes no distinction as to nationality.

The sanitary condition and arrangements of the ships are described in the Kamaran report as good, and the health of the pilgrims as satisfactory. On the voyage 30 deaths occurred, and from one ship five persons suffering from small-pox were landed at Aden.

During the period of quarantine at Kamaran 122 pilgrims were admitted to hospital and there were 35 deaths, due chiefly to acute and chronic bronchial and pulmonary affections, gastric and intestinal diseases, and old age and debility. The disinfection at Kamaran was carried out satisfactorily and there was no second disinfection as in previous years. The Haj report states that "the health during the pilgrimage was very satisfactory:" a few cases of small-pox occurred but the disease did not spread in epidemic form. The sanitary condition of Jeddah and Mecca was satisfactory.

The pilgrims, 18,072 in number, returned in 25 vessels between the 2nd of March and the 3rd of July 1906. During the homeward voyage 240 deaths occurred, the chief causes being old age, general debility, dysentery and diarrhœa. On ten ships during the voyage there were 34 cases of small-pox, one of measles and three of chicken-pox. Some of the patients were landed and taken into hospital at Aden and the remainder at Bombay. Of all the pilgrims on ships infected with small-pox, only 103 were vaccinated, the rest refusing to avail themselves of the offer of vaccination free of charge. The personal effects of 6,551 pilgrims among whom small-pox appeared were disinfected, after which the pilgrims were made over to the Protector of Pilgrims for despatch to their homes.

Laboratories.—At the *Central Research Institute* at Kasauli the preparation of antivenene and curative sera was continued and routine bacteriological work in connection with the examination of specimens sent for diagnosis was carried out. In March 1906 the staff of the institute commenced an enquiry in connection with the etiology and mode of spread of enteric fever in India; a report of the results obtained up to the present is now in course of publication in the Scientific Memoirs. In July 1907 the enquiry into the causation, prevention and treatment of dysentery in the prisons and lunatic asylums of India, upon which Captain Forster, I.M.S., had been engaged, was placed under the control of the Director of the Institute. A brief summary of the results obtained in this enquiry will be found on pages 108—109.

The *Bombay Bacteriological Laboratory* at Parel has two sections, the anti-plague vaccine section and the bacteriological section. The work of the first section has already been referred to in the chapter on the chief diseases. The room in the bacteriological section fitted up for the accommodation of outside workers, and other rooms in the laboratory, were occupied throughout the year by the Plague Research Commission, so that although several applications from outside workers were received none could be admitted. During the nine months from the 1st of April to the 31st of December 1906 the routine work undertaken in diagnosis and research for medical men in the Bombay Presidency included the examination of 358 samples of blood by the serum test for typhoid fever, paraty phoid fever and Malta fever, 131 films of blood for malaria parasites, spirilla of relapsing fever, plague bacilli, etc., and 32 specimens of sputum for tubercle bacilli, pneumococci, etc.

In all 183 animals were received for examination of which 84 were rats sent by private persons to be examined for the diagnosis of plague and 33 were dogs to be examined for the diagnosis of rabies. The research work done by the staff of the laboratory during the year included an investigation by the Director (Lieutenant-Colonel Bannerman, I.M.S.) to ascertain the relative value of the constituents of the anti-plague vaccine; an investigation of the value of Dr. Brazil's curative plague serum; investigations into an outbreak of cholera in the Umarkhadi jail; into an epidemic of infantile diarrhœa in the Cama hospital; into the life history and mode of transmission of the spirillum of relapsing fever, etc. The collection of snake venom was continued, 371 snakes being received during the year. The venom, after desiccation, was sent to the Central Research Institute for the preparation of antivenene.

The *King Institute of Preventive Medicine* at Guindy, Madras, also has two sections, the small-pox vaccine section and the bacteriological section. The work of the vaccine section has been mentioned in the chapter on vaccination. The routine work of the bacteriological section during the year included the examination of 1,083 specimens sent by medical and sanitary authorities. Of these specimens 396 were sent for diagnosis of plague, 217 for malaria, 134 for typhoid and similar fevers, 57 for tuberculosis, 12 for kala azar and 10 for hydrophobia; and 123 were tumours and 95 were samples of water. The research work carried out by the staff dealt with the bacteriological examination of Indian waters, the efficiency of cyllin as a disinfectant, the extraneous organisms of vaccine, the development of *Piroplasma canis* in the tick, kala azar, mammalian hæmogregarines, and other subjects. A summary of the results obtained in a few of these investigations is given on pages 110-112. The educational work done at the Institute included a course of lectures in mine sanitary engineering, a course of instruction for plague inspectors, and lectures and practical instruction in human and animal vaccination.

At the *Pasteur Institute*, Kasauli, during 1906 the number of persons who presented themselves for anti-rabic treatment was 1,147, of whom 350 were Europeans and 797 were natives. Among the Europeans 181 were soldiers and 169 were civilians, the corresponding numbers among the natives being 52 and 745. Patients came from every province, from the Native States of Rajputana and Kashmir and from Ceylon; ten of the eleven patients from Ceylon were European civilians. During the year the treatment was unsuccessful in only nine cases out of the total number treated. In addition to the antirabic inoculations, 282 experiments were conducted with brains sent for the diagnosis of rabies, and 969 specimens sent for diagnostic purposes were examined and reported upon.

The *Pasteur Institute*, Coonoor, was opened for the treatment of patients on the 1st of April 1907 so there is no information concerning its work to be recorded in this issue of the report.

Special enquiries.—In addition to routine work at the bacteriological laboratories enquiries have been or are being carried out with reference to enteric fever, dysentery, malaria, blackwater fever, kala azar, and other subjects.

Enteric fever.—This investigation which was commenced at the Central Research Institute in March 1906 was conducted by the Director of the Central Research Institute [Lieut.-Colonel Semple, R.A.M.C. (retired)] and Captain E. D. W. Greig, I.M.S.; other officers who assisted in the work were Lieutenant-Colonel Wyville Thomson, I.M.S., Captain D. Harvey, R.A.M.C., Captain F. N. White, I.M.S., Captain E. C. Hodgson, I.M.S., and Assistant Surgeon Paras Ram.

Dysentery.—In July 1906 Captain W. C. H. Forster, I.M.S., was placed on special duty under the Sanitary Commissioner with the Government of India to investigate the causation, prevention, and treatment of dysentery in the prisons and lunatic asylums of India. Until the end of the year Captain Forster worked in the jails of the United Provinces and the Punjab and in the laboratories of the Central Research Institute. In the beginning of 1907 he represented that the problems connected with the subject would be more likely to be solved by continuous work at a jail where dysentery is prevalent than by the work which could be done during short visits to many jails, and the Midnapur jail in Bengal was selected as being suitable. The services of two Assistant Surgeons were placed at his disposal, one to assist in the work at the Midnapur jail, the other in the work at the institute. The investigation in the Midnapur jail was commenced on the 1st of February 1907 and, excepting a short period spent on a visit to the Barisal jail in Eastern Bengal and Assam, where a severe epidemic of dysentery was

reported, has been carried on there since that time. In July 1907 the direction and control of the investigation was placed in the hands of the Director of the Central Research Institute.

Captain Forster has furnished three reports of the progress made in the investigation and a brief summary of the results recorded in the most recent of these may be given here with the saving clause that as the problems of the subject are not easy to solve the conclusions arrived at are liable to correction in the light of future work. Under the heading of the causes of acute dysentery Captain Forster states that from the stools of different cases he has been able to isolate the bacillus of Shiga, the bacillus of Flexner, the Y bacillus of Hiss and other varieties of the group, but that from the great majority of cases of bacillary dysentery, the bacilli of Shiga or of Flexner have been isolated. In some cases both these bacilli were present. In the cases of dysentery from which the bacilli can be isolated the stools are characteristic and the bacilli give rise to a definite train of symptoms. The vast majority of cases of acute dysentery are bacillary in origin, and, in first attacks of the disease, bacilli of the dysentery group are nearly always present. Captain Forster reports the finding of two types of amœbae in the stools of patients suffering from dysentery; one has characters similar to those of the *A. histolytica*, the other to those of the *A. coli*. The first type is the one nearly always found. Amœbae are often present in cases of chronic dysentery, but seldom in cases of acute dysentery (13 times in 88 cases); flagellates and ciliates are usually, and Shiga's bacillus is sometimes, present when amœbae can be found. Amœbae do not appear to be capable of causing a definite group of symptoms and they are not associated with a definite type of stool. Captain Forster considers that in a proportion of cases the presence of amœbae in the stools is secondary to an infection with Shiga's bacillus and that usually cases of chronic as well as cases of acute dysentery are bacillary in origin. Under the heading of the mode of spread of the disease he states that in the Midnapur jail dysentery is not due to infection of the general food or water supply or to infection of the soil, but that there is much evidence in favour of the view that the spread of the disease is due to the presence of "bacilli carriers". He has made experiments to ascertain the length of life of the bacilli of Shiga and Flexner outside the human body; in clothing and sheets the bacilli were killed by exposure in the sun for one hour, in blankets by exposure for two hours; and the bacilli could not be recovered from a specimen of mucus which had been placed in a glass tube and kept in a dark cupboard for 24 hours. These observations are in favour of the view that the bacilli cannot live in nature as saprophytes. The problem of the spread of dysentery by "bacilli carriers" is now being investigated bacteriologically on the same lines as has already been done in the case of enteric fever.

Malaria.—The Drainage Committee which, as was stated in this chapter of the last report, was appointed under the orders of the Government of Bengal to enquire into the conditions of drainage in the Presidency Division of Bengal and their connection with the prevalence of malaria, assembled in November 1906 and continued its enquiries until the 15th of March 1907. To assist the committee with expert knowledge the services of Captain Stewart, I.M.S., and Lieutenant Proctor, I.M.S., were lent temporarily to the local Government. The report of the committee has been considered by the local Government and it is understood that steps to give effect to the various recommendations made are being taken.

Blackwater fever.—In April 1907, as a result of a representation from the Duars Planters' Association, the Government of India in consultation with the Government of Eastern Bengal and Assam, arranged that an enquiry, regarding blackwater and other fevers prevailing in the Duars should be conducted. It was decided that the enquiry should be undertaken by the Central Research Institute assisted by an Advisory Committee consisting of (1) the Sanitary Commissioner with the Government of India, (2) the Director of the Central Research Institute, (3) the Professor of Pathology at the Medical College, Calcutta, (4) Captain S. P. James, I.M.S., (5) Captain S. R. Christophers, I.M.S. The Sanitary Commissioner was given power to add to the number of this Committee and in June, Lieutenant-Colonel Hare, Sanitary Commissioner, Eastern Bengal and Assam, was added. It was considered that the first stage of the investigation should be a careful survey of existing conditions in the tea-gardens of the Duars especially with the object of obtaining information with regard to (1) the chief diseases which cause sickness and death among Europeans and Natives in the planting communities, (2) the conditions under which the European and Native members of the planting communities live, and the extent to which these conditions may conduce to the sickness and mortality, (3) the steps which are being taken to prevent disease, (4) the prevalence of

blackwater fever among Europeans and Natives and its distribution in the Duars. The services of Dr. C. A. Bentley, medical officer of the Empire of India and Ceylon Tea Company, were engaged for the conduct of this preliminary investigation. Dr. Bentley entered upon his duties early in July 1907 and after short visits to Simla and Kasauli to receive instructions from the Advisory Committee and to obtain the apparatus required, proceeded to Sam Sing in the Duars where he interviewed the Chairman of the Duars Planters' Association and some members of a special Malaria Committee which had been convened there. On the advice of these gentlemen Dr. Bentley decided to commence work in the Dam Dim district. Up to the 3rd of October 1907, in addition to obtaining valuable information regarding the special subjects with which his enquiry was chiefly concerned, Dr. Bentley had been able to make a number of important observations on malaria in different parts of the Duars and he had seen or had received reports of twelve cases of blackwater fever, the majority of which were among natives. In view of these observations it was decided in November that the material available for the study of the etiology of blackwater fever in the Duars was sufficient to render a successful investigation possible, and one of the members of the Advisory Committee, Captain Christophers, I.M.S., whose previous work in connection with the subject is well known, was deputed for this investigation. Captain Christophers handed over his duties as Superintendent of the King Institute at the end of November and proceeded to join Dr. Bentley in the Duars. The results of his work will, it is hoped, add to the existing knowledge of this fatal disease.

Kala azar.—Captain Patton, I.M.S., who was attached to the King Institute at Guindy for the purpose of investigating the extra-corporeal life of the parasite of kala azar, has continued his researches with the result that he has found that the parasite may, under certain conditions, undergo development in the body of a species of bed-bug. With the exception of this observation there has been no important contribution to our knowledge of the subject of kala azar during the year, and the correct zoological position of the Leishman-Donovan parasite still remains undecided. Apparently Laveran and some other protozoologists of authority are still of opinion that the parasite is a species of *piroplasma* and it will not be out of place to enumerate the chief results of work which has been done (mostly by medical officers in India) towards a settlement of the question. (1) It is now known that the Leishman-Donovan parasite does not invade the red blood corpuscles, as some at first supposed, but the endothelial cells and leucocytes; and although the invasion of a different kind of host cell is not in itself sufficient evidence of absence of relationship between organisms, the fact that the Leishman-Donovan parasite is not parasitic in the red blood cells, is at least some evidence that it is not one of the *piroplasmata*, all known species of which are parasitic in those cells. (2) The results of recent work upon the morphology of *piroplasma* show that there is little if any affinity between the chromatin masses in this parasite and in the Leishman-Donovan parasite; the minute punctiform mass of chromatin in *piroplasma*, called by Schaudinn and Luhe the blepharoplast, is by no means always present and very probably is not a true blepharoplast. (3) It is known from the work of Rogers and others that the Leishman-Donovan parasite as seen in the human body is a stage in the development of a flagellate organism, but the researches in connection with the development of *piroplasma* in the tick carried out by Koch, Kleine, and especially by Christophers, show that *piroplasma* has no flagellate stage in its life cycle. (4) Considerable doubt has been thrown upon the value of the experiments upon which Schaudinn based his view that a flagellate stage is common to many parasitic protozoa by the discovery that a large percentage of mosquitoes are normally infected with flagellates derived through the larva, as well as by the discovery that in birds latent infection with trypanosomes is very frequent.

So far as the work done up to the present time justifies a conclusion, it may be said that the Leishman-Donovan parasite is most closely related to certain flagellates which are commonly found in the alimentary canal of some arthropods. Several species of these flagellates have been studied by Captain Patton, with a view to throw light upon the life history of the Leishman-Donovan parasite, and he has shown that in many of them there is a stage in which they resemble very closely the Leishman-Donovan parasite as it is seen in the human tissues. The earliest stage of a flagellate parasitic in *C. pipiens* in Madras is described by Captain Patton as being found in the larva, in which it resembles almost exactly the parasite of kala azar; in the nymph many of these forms have developed flagella, whilst in the adult mosquito the characteristic *herpetomonas* forms, described by other observers, are seen. In the alimentary canal of a small homopterous insect (*Peritoppus*) he found in the young nymphs similar round and oval parasites with

the arrangement of the chromatin masses characteristic of the Leishman-Donovan parasite, and he has since found other flagellates in which there is a small round non-flagellate stage.

As regards the discovery that the Leishman-Donovan parasite may undergo development in the body of a species of bed-bug, it was mentioned in the issue of this report for 1905 that Captain Patton had been able to find the parasite in the alimentary canal of bugs fed on patients suffering from kala azar and that in some of the parasites signs of commencing development had been observed. More recently Captain Patton has been able to obtain in a series of bugs fed on a patient in whom there were numerous parasites in the leucocytes of the peripheral blood, specimens showing all the stages of development of the parasite up to fully developed elongated flagellates. The forms found in the alimentary canal of the bug are in many respects similar to those which can be obtained *in vitro*, but there is a greater tendency to the formation of rosettes. It has been found by several observers that the bed-bug is free from parasitic flagellates and the feeding experiments carried out by Captain Patton point with some degree of certainty to its being the agent which transmits kala azar.

The bug in which development of the parasite has been observed is *Cimex macrocephalus* (Fieb.) a species which until recently was reported to be present in Burma only. It is now known, however, that its distribution in the East is wide, specimens having been sent to Captain Patton from India, Burma, Assam, the Malay States, Aden, Mauritius and Réunion. The bed-bug from Réunion was described by Signoret in 1852 under the name *C. rotundatus*, but the two species *C. rotundatus* and *C. macrocephalus* are indistinguishable, and Captain Patton proposes to revert to the name *C. rotundatus* which has the merit not only of priority but of being more appropriate. *C. lectularius*, which is the ordinary bed-bug of Europe and America, also occurs in the East, but in India it does not appear to be so common as *C. rotundatus*.

The life history of Piroplasma.—Among the special enquiries which have been carried out since the last issue of this report none is of greater interest than that undertaken by Captain S. R. Christophers, I.M.S., with the object of adding to our knowledge of the life history of parasites of the genus *Piroplasma*. Even before Major Ross had demonstrated the part played by mosquitoes in the transmission of malaria, Smith and Kilborne had shown that Texas fever in cattle, a disease due to *Piroplasma bigeminum*, is conveyed by the bites of ticks, and it was known also that the transmission is effected not by the bites of ticks which have fed on an infected animal, but by the bites of the progeny of such ticks. Many able observers, however, had failed to discover the processes involved in this complicated method of transmission, and until quite recently, when Koch succeeded in finding in ticks fed on suitable animals what may be regarded as the first stage in the developmental changes undergone by the parasite after ingestion by the tick, nothing beyond what had been discovered by Smith and Kilborne in 1893 was known of the life history of the parasite outside the bodies of infected animals. The difficulties met with in attempting to trace a parasitic protozoon through its intermediary host are very great and those in connection with *piroplasma* are especially so on account of the small size of the parasite and the complex structure of the tick, but Captain Christophers had prepared himself for the task by a prolonged study of the parasite in its animal host and by a thorough investigation of the normal anatomy and histology of ticks. The results of his work on the latter subject were published as No. 23 of the new series of the Scientific Memoirs. For reasons into which it is not necessary to enter here, Captain Christophers chose the species of *piroplasma* met with in the dog (*Piroplasma canis*) as the one the life history of which he would endeavour to work out, and at the outset there arose the difficulty that the only species of tick (*H. leachi*) which up to that time was known to transmit the parasite, does not occur in India. It was necessary therefore to ascertain which of the Indian ticks transmits the disease and this was accomplished by an investigation lasting several months. It was found that in India *Piroplasma canis* is conveyed by the species of tick called *R. sanguineus* and the investigation of the life history of the parasite was therefore commenced by a minute examination of ticks of this species which had been fed upon infected dogs. After many fruitless examinations had been made, forms of the parasite showing definite signs of development were at length found, and continued effort resulted in the discovery of all the important developmental changes which the parasites undergo during their life in the tick. The following is a very brief summary of these changes. Some of the forms of the parasite in the peripheral blood of the infected animal, after having reached the alimentary canal of the tick, enlarge and become round or oval bodies about four times the size of the original parasite. Each

of these bodies then becomes divided into two nearly equal portions, one of which contains the mass of chromatin of the original parasite. The two portions separate except at one point and the portion not containing the chromatin swings round to become the tail end of a club-shaped body, the portion which contains the chromatin becoming the head end. These club-shaped bodies are composed of delicate transparent protoplasm free from granulations and the chromatin mass which they contain resembles that in the form of the parasite seen in the animal host. When fully developed they carry at the thicker extremity a curious disc-like structure bearing short blunt cusps. They are the developmental stage of the parasite which was also discovered by Koch. They are mobile, showing in some instances leach-like movements, in others a side to side movement of the thinner end, and when mature they leave the gut of the tick and become lodged near the ovaries and oviducts, finally entering the substance of the ova in which they proceed to develop into what Captain Christophers terms the "zygote". The change from club-shaped body to "zygote" consists mainly in swelling of the middle portion of the parasite, disappearance of the tail end and of the disc and great increase in size; the parasite also has a greater affinity for basic stains. All stages in the further development of the "zygote" have not been completely worked out in the egg and larva, but they have been followed in the tissues of nymphs fed on infected animals. When a nymph is fed on an infected animal the club-shaped bodies develop in its alimentary canal in the same way as in the alimentary canal of an adult tick, but when the club-shaped bodies are mature they become lodged not in the ovary, which is as yet undeveloped, but in certain undifferentiated tissue which at the period of metamorphosis is remodelling the adult tick within the skin of the nymph. In the embryonic cells of this tissue the club-shaped bodies develop into "zygotes" which grow rapidly and become very large bodies with a characteristic appearance. Ultimately the contents of the "zygote" become differentiated into many hundreds of small pear-shaped bodies resembling the forms of the parasite seen in the blood of the animal host. By a process which Captain Christophers has followed out with some exactness, these pear-shaped forms, which, provisionally, he has termed "sporozoits," become lodged in enormous numbers in the salivary glands of the adult tick. The life history of *Piroplasma canis* as described by Captain Christophers is therefore as follows. The parasites in the blood of the animal host are sucked into the alimentary canal of an adult tick (*R. sanguineus*) or of a nymph. In both cases the parasites develop into club-shaped bodies. When the parasites have been ingested by an adult tick the club-shaped bodies penetrate the ova where they develop into "zygotes" which increase in size and undergo developmental changes so that by the time the ovum has become a larva they are in the stage termed "sporoblasts." By the time the larva has become a nymph the "sporoblasts" have become differentiated into immature "sporozoits," and in the adult tick these "sporozoits," now fully mature, are found in enormous numbers in the salivary glands. When the parasites of the animal host have been ingested by a nymph, similar changes occur. The club-shaped bodies leave the gut and become lodged in the cells of the embryonic tissue where they develop into "zygotes" which break up into "sporoblasts." Owing to the growth of the embryonic tissue the "sporoblasts" become disseminated throughout the cell tissue of the nymph. Many of the cells of this tissue are those which form the salivary glands of the adult tick so that by the time the "sporoblasts" have become differentiated into "sporozoits," the latter are already in the cells of the salivary glands of the adult tick; the "sporozoits" which have become developed in cells of other tissue possibly reach the salivary glands by their own movements.

The developmental changes described by Captain Christophers suggest that the life history of *Piroplasma canis* has many points in common with that of the malaria parasite, and although many details still require to be worked out, there can be no doubt that the problem of discovering the chief events in the life history of parasites of the genus *Piroplasma* has been satisfactorily solved.

The rats of India.—With a view to obtain precise information regarding the distribution, life history, habits, and identification of the rats of India, the collection of material for a comprehensive study of the subject has been begun. It was arranged by the Government of India that the first steps in the matter should be taken by the Natural History Section of the Indian Museum and accordingly Dr. Annandale, the Officiating Superintendent of the museum, caused a pamphlet to be prepared by Dr. W. C. Hossack of the Plague Department, Calcutta, giving details of the methods of identification of the common species, with instructions as to the measurements to be taken, the preparation of skins and skulls, the preservation and labelling of specimens, and the mode of despatch

of specimens to the museum. This pamphlet has been widely circulated among officers employed on plague duty and sanitary work in all provinces and instructions have been issued to these officers to aid the Natural History Section of the museum in their enquiry by collecting information and sending specimens. Dr. Hossack, the author of the pamphlet mentioned above, has made a special study of the rats of Calcutta and the results of his work have been published as No. 1 of the first volume of the memoirs of the Indian Museum.

The biting flies of India.—An enquiry into this important subject is being conducted by Mr. Maxwell-Lefroy and Mr. Howlett, the Imperial Entomologists in India, and with the object of enlisting the help of medical officers and others in the enquiry a pamphlet on the subject of biting flies has been prepared and will be distributed as widely as possible. In view of the possibility that cases of sleeping sickness may be imported into India from East Africa, it was necessary to ascertain whether the tsetse-fly which carries the disease occurs in India. A search has been made in various parts of the country and especially in Assam by medical officers and by the Imperial Entomologist, but up to the present no evidence of the presence of this fly in India has been obtained. In September 1906, on the recommendation of Lieutenant-Colonel Bannerman, I.M.S., Director of the Bombay Bacteriological Laboratory, the Government of Bombay issued a circular to officers of the Forest and Salt Departments and to all Political Agents in the Presidency, asking for the names of those who would be willing to collect biting flies in order that they might be supplied with nets and other necessaries for this purpose. Lieutenant-Colonel Bannerman reports that more than a hundred officers have expressed their willingness to assist.

Scientific Memoirs.—Since the issue of the last report the following memoirs have been published :—No. 27, *Preliminary report on the development of the Leishman-Donovan body in the bed-bug*, by Captain W. S. Patton, I.M.S.; No. 28, *The Sexual cycle of Leucocytozoon canis in the tick*, by Captain S. R. Christophers, I.M.S.; No. 29, *Piroplasma canis and its life cycle in the tick*, by Captain S. R. Christophers, I.M.S.; No. 30, *The theory and practice of anti-rabic immunisation*, by Captains W. F. Harvey and A. McKendrick, I.M.S.

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EUROPEAN TROOPS.

TABLE I.—SUMMARY, SICKNESS AND MORTALITY.

A.—COMMANDS AND DIVISIONS.	Years.	Average strength.	RATIO PER MILLE OF STRENGTH. Admissions into hospital.	Constantly sick.	Deaths.	Invaliding.	DEATHS FROM Cholera.	Small-pox.	Enteric fever.	Heat-stroke.	Tubercle of the lungs.	Pneumonia.	Dysentery.	Abscess of the liver.
Northern Command	1905	18,474	801	40	9·08	30	...	...	3·12	1·15	·27	·82	·05	·44
	1906	18,699	848	43	8·45	30	...	·11	2·68	·96	·21	·32	·43	·91
Western ,, ...	1905	19,537	896	55	11·62	49	·20	·05	3·69	·52	·41	·69	·72	1·64
	1906	18,885	936	51	12·02	43	·37	·11	4·08	·74	·42	·16	·95	2·38
Eastern ,, ...	1905	18,983	820	54	10·00	19	·11	...	3·11	1·00	·37	·47	·42	1·42
	1906	18,850	824	54	10·56	25	·64	...	3·71	·27	·21	·48	·27	1·43
2nd (Peshawar) Division	1905	2,767	1,031	54	13·37	23	...	...	5·06	2·89	·36	·72	...	·36
	1906	2,822	1,290	55	8·15	17	...	·35	2·48	2·85	...	...	·35	·35
3rd (Rawalpindi) ,, ...	1905	6,881	963	47	8·72	15	...	...	2·63	·58	·15	·58	...	·44
	1906	6,858	746	48	7·73	25	...	...	3·04	·29	·44	·58	·73	1·31
3rd (Lahore) ,, ...	1905	8,627	773	50	8·00	24	...	...	2·09	1·04	·35	1·04	·12	·46
	1906	9,019	778	46	9·09	18	...	·11	3·10	·89	·11	·22	·22	·78
4th (Quetta) ,, ...	1905	4,382	1,084	60	13·03	50	...	·23	4·63	·23	...	1·39	·93	1·16
	1906	4,099	962	47	10·25	35	...	·24	1·95	·49	...	·73	·24	2·44
5th (Mhow) ,, ...	1905	7,310	891	51	11·63	19	...	...	4·51	·41	·27	·14	·96	2·05
	1906	7,060	1,060	55	16·01	46	·14	·14	7·68	·99	·28	...	1·84	1·98
6th (Poona) ,, ...	1905	6,955	816	55	9·63	21	...	...	3·30	·43	·86	·86	·29	1·29
	1906	6,647	731	48	10·08	24	·90	...	3·86	·15	...	...	·30	2·86
7th (Meerut) ,, ...	1905	8,500	777	51	10·24	18	...	...	4·19	·93	·19	·47	·35	·93
	1906	8,933	832	53	9·63	23	·22	...	4·03	·34	·11	·67	·11	·90
8th (Lucknow) ,, ...	1905	10,393	856	55	921·45	20	·19	...	2·31	1·06	·58	·48	·58	1·83
	1906	9,919	816	58	11·30	27	1·01	...	3·43	·20	·30	·30	·40	1·92
9th (Secunderabad) ,, ...	1905	8,389	813	62	8·46	18	...	...	3·63	·48	...	·36	·60	1·79
	1906	8,820	927	62	9·62	32	1·17	...	3·17	·12	·12	·12	·23	1·88
Burma Division	1905	3,812	971	84	9·71	25	1·31	...	·78	·26	...	1·05	1·31	·26
	1906	3,853	908	53	9·86	19	2·34	...	·26	·26	·26	·26	1·04	·52
Aden Brigade	1905	947	948	66	21·09	63	...	...	3·17	3·17	...	...	1·06	3·17
	1906	1,078	1,294	63	16·70	154	...	...	...	3·71	...	...	1·86	1·86
INDIA	1905	71,343	834	52	10·05	21	·13	·01	2·99	·77	·38	·63	·46	1·16
	1906	70,272	871	51	10·43	18	·05	·06	3·19	·55	·27	·28	·53	1·52

B.—GEOGRAPHICAL GROUPS.	Years.	*Average strength.	RATIO PER MILLE OF STRENGTH. Admissions.	Constantly sick.	ADMISSIONS FROM Influenza.	Cholera.	Small-pox.	Enteric fever.	Intermittent fever.	Remittent fever.	Simple continued fever.	Pneumonia.	Dysentery.	Venereal diseases.
Group I.—Burma Coast and Bay Islands.	1894-1903	1,143	1,350	90	16·3	·1	·3	8·2	181·9	6·0	46·6	1·5	40·2	80·10
	1905	1,259	1,221	52	2·4	...	2·4	·8	87·0	26·2	135·8	2·4	35·7	236·7
	1906	1,375	866	46	2·2	...	1·5	...	42·1	8·0	165·1	·7	22·5	209·5
,, II.—Burma Inland ...	1894-1903	2,391	1,431	92	8·4	·2	·2	4·3	283·9	24·3	48·7	2·3	25·5	244·2
	1905	2,065	823	51	3·6	...	...	2·9	185·6	3·4	65·9	3·6	5·8	157·5
	1906	1,609	943	56	8·1	13·1	...	·7	97·0	1·3	90·1	·6	1·9	107·8
,, IV.—Bengal and Orissa ...	1894-1903	2,163	1,376	83	7·8	1·0	·2	10·6	392·2	34·5	20·7	2·6	68·2	413·1
	1905	1,690	1,160	77	60·4	...	...	3·7	255·6	4·7	32·3	4·7	21·3	344·4
	1906	1,775	1,190	72	6·8	...	·56	8·5	235·9	1·1	89·3	5·6	16·9	362·5
,, V.—Gangetic Plain and Chutia Nagpur.	1894-1903	6,693	1,262	80	9·5	4·9	1·1	38·6	218·9	7·6	47·2	2·8	29·4	440·7
	1905	7,715	801	50	1·3	·3	1·2	17·4	98·4	2·5	104·4	1·6	7·9	197·2
	1906	6,871	788	52	17·6	1·9	2·5	33·3	107·1	·6	52·7	3·1	14·6	107·3
,, VI.—Upper Sub-Himalaya ...	1894-1903	13,880	1,355	84	9·7	·7	·5	44·6	305·3	9·6	19·7	6·2	21·2	365·5
	1905	13,724	816	32	15·8	...	·3	23·3	74·6	9·2	53·6	5·4	4·0	130·6
	1906	13,089	886	35	5·5	·1	·6	13·4	200·9	·5	64·2	4·5	1·8	101·7
,, VII.—North-Western Frontier, Indus Valley, and North-Western Rajputana.	1894-1903	4,791	1,490	79	2·0	·1	·7	19·2	573·8	41·1	26·7	6·8	18·0	299·6
	1905	5,068	1,093	57	23·7	...	1·0	18·9	190·8	·2	64·5	7·1	7·7	190·2
	1906	4,975	1,252	56	6·7	...	2·4	9·4	518·0	·4	74·6	4·6	3·6	86·6
,, VIII.—South-Eastern Rajputana, Central India, and Gujarat.	1894-1903	5,891	1,365	98	2·2	1·1	·8	24·6	430·1	10·8	36·4	3·8	23·2	479·8
	1905	6,362	820	51	5·0	...	3·8	16·8	161·5	6·4	8·7	4·4	12·3	173·7
	1906	6,749	1,027	55	22·6	·3	4·3	34·9	369·5	2·9	25·3	4·5	17·8	118·7
,, IX.—Deccan	1894-1903	9,371	1,258	84	10·2	·8	·6	20·3	251·5	7·1	24·2	3·4	26·7	458·8
	1905	10,434	807	52	6·1	·2	3·6	24·6	102·0	·3	41·9	3·5	19·5	265·3
	1906	10,188	736	49	2·9	1·0	2·5	21·5	88·2	·8	53·8	2·7	20·8	185·6
,, X.—Western Coast ...	1894-1903	1,573	988	69	11·7	·2	·3	6·4	132·1	2·3	34·7	2·7	13·9	354·0
	1905	1,591	855	58	7·5	...	5·7	1·3	152·1	3·8	1·9	3·1	6·3	243·2
	1906	1,444	817	67	·7	...	...	2·8	183·6	...	7·6	·7	11·8	218·5
,, XI.—Southern India ...	1894-1903	3,320	1,197	25	9·3	·2	·7	24·5	452·2	6·2	44·0	2·8	28·4	421·8
	1905	3,728	795	55	...	·3	2·4	13·1	91·9	...	13·2	·5	16·6	209·8
	1906	3,502	1,016	50	3·2	·3	1·1	18·8	64·7	...	29·5	·5	20·5	178·9
,, XIIa.—Hill Stations	1894-1903	8,778	1,026	70	6·0	·3	·1	29·4	166·7	8·1	14·7	5·2	17·0	321·8
	1905	10,508	755	45	5·5	...	·1	10·9	60·0	·3	53·6	5·3	10·6	122·5
	1906	11,235	675	41	4·6	·1	·3	7·3	69·2	1·9	60·5	3·9	9·6	79·9
,, XIIb.—Hill Convalescent Depots, and Sanitaria.	1894-1903	1,226	1,264	84	6·4	·2	·1	15·3	281·2	8·4	9·4	4·3	21·1	298·0
	1905	1,519	819	60	3·1	...	·3	9·7	121·0	·9	13·7	1·1	13·7	140·1
	1906	1,592	807	58	3·1	...	1·4	13·0	93·3	1·1	24·3	4·7	15·9	104·1
INDIA	1894-1903	66,881	1,293	80	6·3	1·0	·5	23·0	311·2	13·5	27·9	4·3	27·5	382·5
	1905	71,343	834	52	14·2	·4	1·4	16·1	151·4	2·3	47·9	4·1	13·4	135·7
	1906	70,272	871	51	11·4	1·0	1·9	15·6	176·2	3·4	55·7	3·4	15·2	117·3

* The decennial ratios are worked on the total strength of the ten years period.

European Troops.

Table II.—Ratios of Commands, 1906.

	Ratios per 1,000 of the average strength.					
	Northern Command.	Western Command.	Eastern Command.	Secunderabad Division.	Burma Division.	India.*
I.—Strength	18,699	18,885	18,850	8,520	3,853	70,272
II.—†Constantly sick rate of each month—						
January	51·4	56·6	50·6	59·0	62·4	53·3
February	43·9	50·0	49·9	58·4	57·3	49·3
March	36·2	44·9	48·5	60·1	50·9	44·9
April	37·3	48·1	46·7	56·5	49·4	44·0
May	41·5	46·2	49·6	54·3	46·3	44·8
June	42·4	40·4	51·6	55·0	49·3	46·0
July	45·9	46·1	55·3	57·4	53·0	50·0
August	41·1	53·3	55·8	61·2	51·1	51·4
September	41·4	59·2	60·6	67·9	55·6	55·2
October	53·9	61·1	61·2	70·1	53·1	57·9
November	78·3	62·5	65·8	70·9	53·0	63·4
December	72·8	56·3	55·7	67·4	53·0	58·0
Of the Year ...	48·1	51·0	54·0	61·5	52·9	51·4
III.—Admission-rate of the year—						
Influenza	20·3	3·2	17·7	1·9	4·2	11·2
Cholera	...	·5	·9	1·5	5·5	1·0
Small-pox	·6	1·9	1·6	·9	·3	1·2
Enteric Fever	15·0	17·6	18·0	18·5	1·6	13·8
Intermittent Fever	225·7	250·0	132·0	59·4	63·1	176·2
Remittent Fever	·5	1·4	·3	...	49·6	3·4
Simple Continued Fever	73·5	48·7	35·6	53·8	121·7	55·7
Tubercle of the lungs	1·5	1·9	1·8	·8	1·6	1·6
Pneumonia	4·6	3·2	3·3	1·9	1·6	3·4
Other Respiratory Diseases	17·1	20·6	21·8	25·4	16·9	20·3
Dysentery	6·3	19·8	12·4	29·5	14·0	13·2
Diarrhœa	12·4	16·7	15·6	7·3	10·6	13·7
Hepatic Abscess	2·6	3·4	2·4	3·8	1·9	2·6
,, Congestion and Inflammation ...	15·6	11·6	14·9	11·9	14·3	13·7
Venereal Diseases	75·7	120·6	126·9	153·9	191·0	117·3
All Causes ...	849·9	936·0	823·7	926·6	898·3	870·8
IV.—Death rate of the year—						
Cholera	...	·37	·64	1·17	2·34	·65
Small-pox	·11	·11	...	...	...	·06
Enteric Fever	2·62	4·08	3·71	3·17	·26	3·19
Intermittent Fever	·21	·37	·21	·12	...	·23
Remittent Fever	...	·16	·05	...	·26	·07
Simple Continued Fever	·05	...	...	...	...	·01
Heat-stroke	·06	·74	·27	·12	·26	·55
Circulatory Diseases	·53	·64	·80	·59	·52	·65
Tubercle of the lungs	·21	·15	·21	·12	·26	·17
Pneumonia	·32	·16	·48	·12	·26	·28
Other Respiratory Diseases	·11	·11	...	·23	...	·09
Dysentery	·43	·95	·27	·23	1·04	·53
Diarrhœa	...	...	...	...	...	...
Hepatic Abscess	·91	2·38	1·43	1·88	·52	1·52
All Causes ...	8·45	12·92	10·56	9·62	9·86	10·43
V.—Percentage in 100 admissions—						
Influenza	2·39	·34	2·14	·20	·46	1·31
Cholera	...	·06	·11	·10	·61	·12
Small-pox	·07	·20	·19	·10	·06	·14
Enteric Fever	1·54	1·88	2·19	2·00	·17	1·79
Intermittent Fever	26·62	26·71	16·03	6·41	7·02	20·23
Remittent Fever	·06	·15	·06	...	5·52	·38
Simple Continued Fever	8·67	5·20	4·32	5·80	13·55	6·40
Tubercle of the lungs	·18	·20	·22	·09	·17	·19
Pneumonia	·54	·34	·40	·20	·17	·39
Other Respiratory Diseases	2·02	2·20	2·65	2·74	1·88	2·33
Dysentery	·74	2·12	1·50	3·18	1·56	1·75
Diarrhœa	1·46	1·78	1·89	·79	1·18	1·57
Hepatic Abscess	·23	·36	·30	·41	·12	·30
,, Congestion and Inflammation ...	1·84	1·24	1·81	1·28	1·62	1·57
Venereal Diseases	8·93	12·88	15·41	16·61	21·27	13·47
VI.—Percentage in 100 deaths—						
Cholera	...	2·9	6·0	12·2	23·7	6·3
Small-pox	1·3	·8	...	...	...	·5
Enteric Fever	31·0	31·6	35·2	32·9	2·6	30·6
Intermittent Fever	2·5	2·9	2·0	1·2	...	2·2
Remittent Fever	...	1·2	·5	...	2·6	·7
Simple Continued Fever	·6	...	...	...	...	·1
Heat-stroke	11·4	5·7	2·5	1·2	2·6	5·3
Circulatory Diseases	6·3	4·9	7·5	6·1	5·3	6·3
Tubercle of the lungs	2·5	·8	2·0	1·2	2·6	1·6
Pneumonia	3·8	1·2	4·5	1·2	2·6	2·7
Other Respiratory Diseases	1·3	·8	...	2·4	...	·8
Dysentery	5·1	7·4	2·5	2·4	10·5	5·0
Diarrhœa	...	...	...	...	...	...
Hepatic Abscess	10·8	18·3	13·6	19·5	5·3	14·6

* Including troops on the line of march, and the Field Force.
† Worked on the aggregates.

European Troops.

Table III.—Ratios of Geographical Groups, 1906.

	Ratios per 1,000 of the Average Strength.												
	I. Burma, Coast and Bay Islands.	II. Burma Inland.	IV. Bengal and Orissa.	V. Gangetic Plain and Chhota Nagpur.	VI. Upper Sub-Himalaya.	VII. N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII. S.-E. Rajputana, Central India, and Gujarat.	IX. Deccan.	X. Western Coast.	XI. Southern India.	XIIa. Hill Stations.	XIIb. Convalescent Depôts, and Sanitaria.	India.*
I.—Strength	1,375	1,609	1,775	6,871	†3,089	4,975	6,246	10,188	1,444	3,802	†1,235	3,592	70,272
II.—†Constantly sick rate of each month—													
January	78·1	69·1	80·3	43·7	51·8	50·4	36·9	36·7	70·8	57·9	43·3	62·2	58·3
February	75·7	58·6	75·5	44·4	45·6	50·1	47·8	43·4	63·3	61·6	38·3	56·2	49·3
March	56·7	59·6	84·3	43·4	41·9	37·6	48·3	42·5	64·3	62·4	30·4	58·3	44·9
April	35·5	59·5	71·3	40·1	44·9	38·0	45·8	41·8	55·3	58·4	31·8	43·8	44·0
May	46·9	47·5	73·4	46·7	53·8	46·6	44·4	39·7	46·5	56·2	34·9	45·5	44·8
June	44·2	54·9	81·3	49·3	50·8	52·8	49·6	37·1	55·9	52·7	37·1	53·0	46·6
July	45·9	61·9	90·2	57·5	52·2	59·7	42·9	43·4	55·1	56·1	40·4	59·4	50·6
August	36·6	57·6	87·8	58·9	49·9	44·4	32·5	36·1	53·7	51·4	42·3	53·7	51·4
September	44·9	57·4	73·0	57·8	58·0	44·4	71·0	60·9	45·2	60·3	44·2	53·9	53·4
October	44·1	51·6	70·3	66·2	62·5	57·8	82·3	59·1	63·8	66·8	45·4	62·8	57·9
November	31·9	52·7	76·2	64·5	66·1	90·2	76·2	57·6	55·1	58·8	66·6	93·3	63·4
December	28·4	53·2	65·5	48·8	62·1	89·3	60·6	56·3	49·0	58·5	53·2	90·0	58·9
Of the Year	46·0	55·9	77·1	51·6	52·9	56·2	55·3	49·0	57·3	58·8	40·6	57·6	51·4
III.—Admission rate of the Year—													
Influenza	2·2	8·1	6·8	17·6	5·5	64·7	22·6	2·9	·7	3·2	4·6	3·1	13·4
Cholera	...	13·1	...	1·9	·1	...	·2	1·9	...	·5	·2	...	1·0
Small-pox	1·5	...	·6	2·5	·6	2·4	4·3	...	...	1·1	·3	1·4	1·2
Enteric Fever	...	3·7	8·5	23·3	15·4	9·8	34·5	28·8	2·8	15·8	7·3	12·9	15·6
Intermittent Fever	42·2	97·0	225·9	107·1	200·9	513·0	369·8	38·2	185·6	64·2	65·2	90·3	176·2
Remittent Fever	8·0	1·2	4·1	·6	·5	·4	2·2	·8	...	...	15·8	1·1	3·6
Simple Continued Fever	165·2	90·1	87·3	58·7	64·2	74·6	75·2	53·8	7·6	30·5	60·5	24·2	55·7
Rheumatic Fever	...	...	...	·3	·4	·8	·3	·2	·7	...	·7	·3	·3
Tubercle of the lungs	1·5	1·9	2·5	2·3	2·1	·8	1·4	1·7	2·8	·5	1·0	2·2	1·6
Pneumonia	·7	1·2	5·1	3·1	4·5	4·4	4·3	2·7	·7	·5	2·9	4·7	3·4
Other Respiratory Diseases	20·4	14·3	22·5	17·0	24·2	17·1	17·6	19·7	20·1	18·7	19·3	28·7	20·3
Dysentery	22·5	9·9	16·9	14·6	7·9	5·6	17·8	30·8	11·8	20·5	6·6	15·9	15·2
Diarrhœa	17·3	8·7	12·3	10·3	13·4	9·8	18·4	10·2	9·7	13·2	20·2	13·1	13·7
Hepatic abscess	1·5	·6	5·1	2·0	2·4	1·8	3·5	4·1	2·8	2·4	1·7	4·2	2·6
„ Congestion and Inflammation.	3·6	31·7	28·7	17·2	15·7	6·8	10·6	10·3	12·5	12·1	13·2	17·0	13·7
Venereal Diseases	209·5	167·8	262·5	107·3	101·7	86·6	118·7	125·0	217·5	178·9	77·9	104·1	117·3
All Causes	865·5	943·4	1,120·0	788·4	885·5	1,251·5	1,026·7	755·9	816·5	1,016·3	674·7	807·3	879·8
IV.—Death rate of the Year—													
Cholera	...	5·39	...	1·46	·14	...	·16	1·57	...	...	...	...	·65
Small-pox	...	...	...	...	·07	·40	·16	...	...	...	...	...	·06
Enteric Fever	...	·62	·56	4·66	3·07	1·81	7·84	6·22	·69	3·16	1·96	3·06	3·19
Intermittent Fever	...	...	...	·29	·43	·20	·32	·10	...	...	·09	·28	·23
Remittent Fever	...	...	...	·15	...	·40	...	·10	...	...	·09	...	·07
Simple Continued Fever	...	...	...	...	·07	...	...	...	...	...	...	...	·01
Heat-stroke	...	·62	·56	·15	·50	2·61	·98	·49	·69	...	...	...	·55
Circulatory Diseases	...	1·24	1·13	·73	·86	·20	·65	·69	·69	·53	·18	1·11	·65
Tubercle of the lungs	...	·62	...	·44	...	...	...	·20	...	...	·09	1·11	·17
Pneumonia	...	...	...	·29	·57	...	·48	...	·69	...	·45	·28	·28
Other Respiratory Diseases	...	...	...	...	·14	...	·16	·20	...	...	...	·28	·09
Dysentery	1·45	1·24	...	·44	·43	·20	1·28	·59	...	·26	·27	·56	·35
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	...	...
Hepatic Abscess	·73	·62	3·38	1·02	1·14	1·41	1·60	2·94	2·08	1·05	·80	2·78	1·52
All Causes	6·55	14·92	9·58	12·08	9·58	10·25	15·68	13·74	6·93	6·84	6·14	10·58	10·43
V.—Percentage in 100 Admissions—													
Influenza	·23	·86	·60	2·23	·62	5·17	2·20	·39	·08	·31	·69	·38	1·31
Cholera	...	1·38	...	·24	·02	...	·03	·25	...	·05	·03	...	·12
Small-pox	·17	...	·05	·31	·07	·19	·42	·08	...	·10	·04	·17	·14
Enteric Fever	...	·40	·73	2·95	1·74	·75	3·40	2·84	·34	1·55	1·08	1·48	1·79
Intermittent Fever	4·87	10·28	20·17	13·59	22·69	40·99	35·99	11·67	22·73	6·37	9·66	11·55	20·23
Remittent Fever	·92	·13	·10	·07	·06	·03	·28	·10	...	...	2·36	·14	·39
Simple Continued Fever	19·08	9·53	7·86	6·68	7·25	5·96	2·46	7·12	·93	4·97	8·97	3·00	6·40
Rheumatic Fever	...	·13	·10	·04	·04	·03	·03	·05	·08	...	·11	·03	·04
Tubercle of the lungs	·17	·26	·20	·39	·23	·06	·14	·22	·38	·05	·25	·28	·19
Pneumonia	·08	·13	·45	·39	·51	·38	·44	·38	·08	·05	·42	·36	·39
Other Respiratory Diseases	2·35	1·52	2·01	2·16	2·74	1·37	1·71	2·61	2·46	1·84	2·86	3·52	2·25
Dysentery	2·61	1·05	1·52	1·85	·89	·45	1·23	4·08	1·44	2·02	·98	1·97	1·75
Diarrhœa	2·02	·92	1·01	1·31	1·52	·79	1·74	1·35	1·19	1·29	2·99	1·62	1·37
Hepatic abscess	·17	·07	·45	·26	·27	·14	·34	·35	·34	·23	·25	·52	·30
„ congestion and inflammation.	·42	3·36	2·57	2·18	1·77	·55	1·03	2·36	1·53	1·19	1·95	2·10	1·37
Venereal Diseases	24·20	17·79	23·44	13·61	11·49	6·92	11·56	16·54	26·63	17·60	11·54	12·90	13·47
VI.—Percentage in 100 Deaths—													
Cholera	...	37·5	...	12·0	4·5	...	1·	17·4	...	...	...	...	6·3
Small-pox	...	...	...	...	·7	3·9	1·0	...	...	...	...	2·8	·5
Enteric Fever	...	4·2	5·9	38·6	32·1	17·6	30·0	30·7	10·0	46·2	31·9	28·9	30·6
Intermittent Fever	...	...	...	2·4	4·5	2·0	2·0	·7	...	...	1·4	2·6	2·2
Remittent Fever	...	...	...	1·2	...	3·9	...	·7	...	...	1·4	...	·7
Simple Continued Fever	...	...	...	...	·7	...	...	...	...	...	...	...	·1
Heat-stroke	...	4·2	5·9	1·2	5·2	25·5	6·1	3·6	10·0	...	2·9	10·5	8·3
Circulatory Diseases	...	8·3	11·8	6·0	9·0	2·0	4·1	5·0	10·0	7·7	2·9	10·5	8·2
Tubercle of the lungs	...	4·2	...	3·6	...	...	...	1·4	...	...	1·4	2·6	2·7
Pneumonia	...	...	...	2·4	6·0	...	3·1	...	10·0	...	7·2	2·6	·8
Other Respiratory Diseases	...	...	...	...	1·5	...	2·0	1·4	...	...	...	2·6	·8
Dysentery	22·2	8·3	...	3·6	4·5	2·0	8·2	4·3	...	3·8	4·3	5·3	5·0
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	...	...
Hepatic Abscess	11·2	4·2	35·2	8·4	11·9	13·7	10·2	28·4	30·0	15·4	13·0	26·3	14·6

† Worked on the aggregates.

* Including troops on the line of march and the Field Force.

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TABLE IV.—STRENGTH, ADMISSIONS FROM ALL CAUSES AND ADMISSIONS FROM ENTERIC FEVER WITH RATIOS PER 1,000, IN 1906, IN RELATION TO AGE AND LENGTH OF RESIDENCE IN INDIA.

	BY AGE.						BY LENGTH OF RESIDENCE.						
	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.	Under 1 year.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 years and upwards.
Strength	2,357	33,189	23,530	7,909	2,107	454	14,682	14,126	11,925	12,062	6,184	7,574	2,983
Per cent. of total	3	48	34	11	3	1	21	20	17	17	9	11	4
1901-1905	3	45	37	11	3	1	19	16	16	13	11	20	5
Admissions from all causes ...	1,480	33,631	20,250	4,537	985	240	11,756	11,200	9,338	10,390	6,873	9,037	2,539
Admissions from Enteric Fever ...	35	739	283	46	11	1	342	283	146	176	74	64	10
All causes per 1,000	627·9	1,013·3	860·6	573·7	467·5	528·6	800·7	792·3	783·1	861·4	1,111·4	1,193·2	847·8
Enteric Fever per 1,000.	10·6	22·0	12·0	5·8	5·2	2·2	23·3	20·0	12·2	14·6	12·0	8·4	3·4
Liability to Enteric Fever (The previous column expressed in percentages)	18·34	38·06	20·76	10·03	9·00	3·81	24·81	21·30	12·99	15·53	12·78	8·95	3·62
Enteric Fever per cent. of all causes ...	1·69	2·17	1·40	1·01	1·12	·42	2·91	2·53	1·56	1·69	1·08	·71	·40

TABLE V.—ADMISSION AND DEATH RATES FROM ENTERIC FEVER IN STATIONS OF OVER 1,000 IN STRENGTH.

Stations.	1906.		DECENNIUM, 1894-1903.		Stations.	1906.		DECENNIUM, 1894-1903.	
	Admission-rate per 1,000.	Death-rate per 1,000.	Admission-rate per 1,000	Death-rate per 1,000.		Admission-rate per 1,000.	Death-rate per 1,000.	Admission-rate per 1,000.	Death-rate per 1,000.
Mhow	42·5	9·39	38·7	8·40	Ranikhet ...	11·3	4·58	31·2	4·88
Jhansi	41·2	14·98	31·3	9·27	Bareilly ...	5·2	80	22·8	4·17
Lucknow	36·0	6·01	37·9	9·88	Quetta ...	6·7	1·98	33·8	8·08
Agra	34·8	9·15	44·1	11·50	Chakrata ...	5·7	·81	31·3	4·37
Poona	29·2	5·95	18·7	5·38	Ambala ...	5·1	·79	39·3	9·50
Secunderabad	28·4	4·64	22·1	5·15	Ahmednagar ...	4·8	·96	36·4	7·97
Meerut	24·5	4·91	35·3	10·87	Wellington ...	4·7	...	11·5	2·21
Bangalore	20·9	4·90	21·5	4·58	Karachi ...	3·4	1·72	5·3	1·44
Peshawar	20·2	2·97	33·9	14·10	Fort William ...	3·4	...	4·6	1·19
Belgaum	17·9	5·38	5·3	1·76	Colaba ...	2·7	·89	3·8	1·93
Cawnpore	17·7	5·58	19·6	3·92	Sialkot ...	1·6	...	15·2	5·06
Rawalpindi, ...	15·3	2·24	24·0	5·80					

TABLE VI.—ARRIVALS, AGE AND LENGTH OF RESIDENCE IN RELATION TO VENEREAL DISEASES AND ENTERIC FEVER.

YEAR.	ARRIVED IN INDIA.*		YEAR.	MEN.								
				PER CENT. OF STRENGTH.			Strength.	RATIO PER 1,000.			RATIO PER CENT. OF TOTAL ADMISSION.	
				Age.	Length of residence.	Married. ‡		Admissions.			Venereal Diseases.	Enteric Fever.
	Men.	Women.		Under 25 years.	Under 5 years.			All causes.	Venereal Diseases.	Enteric Fever.		
1887-88 ...	11,729	459	1887	52	73	3·84	63,515	1,369·7	361·2	12·7	26·37	·93
1888-89 ...	12,407	506	1888	50	76	3·65	68,887	1,381·7	370·6	13·6	26·82	·99
1889-90 ...	12,270	532	1889	49	78	3·60	69,266	1,498·0	481·5	22·9	32·14	1·53
1890-91 ...	14,046	542	1890	50	80	3·70	67,823	1,520·4	503·5	18·5	33·12	1·22
1891-92 ...	15,456	529	1891	51	79	3·36	67,030	1,379·1	400·7	20·4	29·06	1·48
1892-93 ...	13,894	540	1892	51	80	3·29	68,137	1,517·3	498·9	22·1	27·01	1·46
1893-94 ...	15,096	482	1893	53	79	3·29	70,891	1,414·9	406·9	20·6	32·94	1·41
1894-95 ...	18,857	517	1894	54	81	... †	74,082	1,508·0	518·4	20·9	33·91	1·38
1895-96 ...	14,346	654	1895	55	83	...	71,031	1,461·8	522·3	26·3	35·73	1·80
1896-97 ...	14,805	545	1896	56	82	...	70,484	1,586·7	511·6	25·5	30·89	1·84
1897-98 ...	16,227	543	1897	55	84	...	68,395	1,550·9	485·7	32·4	31·20	2·06
1898-99 ...	16,911	648	1898	54	81	...	67,741	1,438·9	362·9	36·9	25·26	2·57
1899-1900 ...	3,859	468	1899	53	78	...	67,897	1,148·7	313·4	20·6	27·28	1·79
1900-01 ...	5,038	185	1900	45	63	...	60,553	1,163·2	298·1	18·4	26·07	1·40
1901-02 ...	18,594	438	1901	42	63	...	60,858	1,104·3	276·0	12·8	24·99	1·16
1902-03 ...	24,840	961	1902	43	68	...	60,540	1,078·4	281·4	16·7	26·09	1·55
1903-04 ...	15,126	758	1903	51	76	...	70,445	1,033·4	247·0	19·6	23·90	1·90
1904-05 ...	16,366	820	1904	52	80	...	71,083	900·4	198·5	19·6	22·05	2·18
1905-06 ...	15,178	804	1905	52	84	...	71,343	834·3	153·7	16·1	18·42	1·93
1906-07 ...	18,636	912	1906	51	84	...	70,272	870·8	117·3	15·6	13·47	1·79

* In ordinary years the departures plus the deaths nearly balance the arrivals. † Return abolished. ‡ On the 1st May of each year.

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TABLE VII.—RELATION OF MORTALITY TO AGE AND LENGTH OF RESIDENCE IN INDIA.

A.—AGE.

Causes of Death.	(a) DIED PER 1,000.						(b) LIABILITY IN PERCENTAGES.					
	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.
Enteric Fever ...	2·12	4·64	2·08	1·64	1·42	...	18	39	17	14	12	...
Cholera ...	·42	·69	·76	·38	·47	...	15	25	28	14	17	...
Dysentery ...	...	·63	·55	·25	·47	...	...	33	29	13	25	...
Intermittent and Remittent Fevers.	...	·27	·42	·13	·47	...	...	21	33	10	36	...
Alcoholism ...	...	·03	·08	·13	·95	...	...	3	7	11	80	...
Tubercle of the lungs	...	·15	·21	·25	...	...	...	25	38	41	...	...
Nervous Diseases ...	·42	·18	·04	·13	...	2·20	14	6	1	4	...	74
Circulatory Diseases	...	·24	·55	1·96	3·80	4·41	...	2	5	17	35	40
Pneumonia ...	...	·39	·25	·13	...	...	...	51	33	17	...	...
Other Respiratory Diseases.	·42	·03	·13	...	·47	...	40	3	13	...	45	...
Abscess of the liver...	...	·75	2·72	1·64	2·37	...	...	10	36	22	32	...
Urinary Diseases ...	...	·12	·13	·25	·47	...	...	12	13	26	48	...
TOTAL ...	3·39	8·14	7·95	6·83	10·92	6·61	8	19	18	16	25	15
Heat-stroke ...	...	·21	·68	1·14	·95	11·01	...	2	5	8	7	99
Suicide ...	...	·21	·30	·63	·95	...	...	10	14	30	45	...
Other injuries ...	·42	·66	·85	·63	·47	...	14	22	28	21	16	...
All Causes ...	3·82	10·24	10·88	10·75	15·19	22·03	5	14	15	15	21	30

B.—LENGTH OF RESIDENCE IN INDIA.

Causes of death.	(g) DIED PER 1,000.						(h) LIABILITY IN PERCENTAGES.					
	Under one year.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.	Under 1 year.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.
Enteric Fever ...	3·88	4·03	2·77	2·98	2·75	2·77	1·61	19	20	14	15	14	14	5
Cholera ...	·41	·98	·42	·91	·65	·79	·34	9	21	9	21	15	18	8
Dysentery ...	·82	·57	·34	·50	·49	·40	·34	24	16	10	14	14	12	10
Intermittent and Remittent Fevers.	·20	·21	·25	...	·65	1·06	...	8	9	11	...	27	45	...
Alcoholism ...	...	·14	...	...	·16	·26	·34	...	16	...	...	18	29	38
Tubercle of the lungs	·14	·14	...	·47	·49	·26	·34	9	9	...	11	32	17	22
Nervous Diseases ...	·07	·14	·68	·23	...	·40	...	7	15	9	27	...	43	...
Circulatory Diseases	·27	·14	·67	·13	·32	2·38	2·68	4	2	10	5	5	35	39
Pneumonia ...	·20	·21	·25	·33	·49	·40	·34	9	9	11	15	22	18	15
Other Respiratory Diseases.	·07	·14	...	...	·16	·13	·34	8	17	...	...	19	15	40
Abscess of the liver...	·75	1·49	1·51	1·58	1·94	2·38	2·68	6	12	12	13	16	19	22
Urinary Diseases ...	·07	·21	...	·25	·16	·26	...	7	22	...	26	17	27	...
TOTAL ...	6·88	8·35	6·29	7·30	8·25	11·49	8·38	12	15	11	13	14	20	15
Heat-stroke ...	·34	·35	·25	·91	·49	·92	1·68	7	7	5	18	10	19	34
Suicide ...	·14	·42	·17	·17	·65	·40	·67	5	16	6	6	25	15	26
Other injuries ...	·95	·35	·51	·75	·49	1·45	...	21	8	13	16	11	32	...
All Causes ...	9·13	10·05	8·05	10·69	11·64	15·84	13·07	12	13	10	14	15	20	17

Causes of death.	(c) NUMBER OF DEATHS.						(d) COMPOSITION OF 100 DEATHS AT EACH AGE.					
	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.
Enteric Fever ...	5	154	49	13	3	...	56	45	19	15	9	...
Cholera ...	1	23	18	3	1	...	11	7	7	4	3	...
Dysentery ...	...	21	13	2	1	...	...	6	5	2	3	...
Intermittent and Remittent Fevers.	...	9	10	1	1	...	...	3	4	1	3	...
Alcoholism ...	...	1	2	1	2	...	...	0	1	1	6	...
Tubercle of the lungs	...	5	5	2	...	...	...	1	2	2	...	...
Nervous Diseases ...	1	6	1	1	...	1	11	2	0	1	...	10
Circulatory Diseases	...	8	11	15	8	2	...	2	5	18	25	20
Pneumonia ...	...	13	6	1	...	...	...	4	2	1	...	...
Other Respiratory Diseases.	1	1	3	...	1	...	11	0	1	...	3	...
Abscess of the liver...	...	25	64	13	5	...	...	7	25	15	16	...
Urinary Diseases ...	...	4	3	2	1	...	...	1	1	2	3	...
TOTAL ...	8	270	187	54	23	3	89	79	73	64	72	30
Heat-stroke ...	...	7	16	9	2	5	...	2	7	11	6	50
Suicide ...	...	7	7	5	2	...	...	2	3	6	6	...
Other injuries ...	1	22	20	5	1	...	11	6	8	6	3	...
All Causes ...	9	340	256	85	32	10	100	100	100	100	100	100

Causes of death.	(i) NUMBER OF DEATHS.							(j) COMPOSITION OF 100 DEATHS IN EACH PERIOD OF RESIDENCE.						
	Under 1 year.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.	Under 1 year.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.
Enteric Fever ...	57	57	33	36	17	21	3	43	40	34	28	24	17	8
Cholera ...	6	13	5	11	4	6	1	4	9	5	9	6	5	3
Dysentery ...	12	8	4	6	3	3	1	9	6	4	5	4	2	3
Intermittent and Remittent Fevers.	3	3	3	...	4	8	...	2	2	3	...	6	7	...
Alcoholism ...	...	2	...	...	1	2	1	...	1	...	...	1	2	3
Tubercle of the lungs	2	2	...	2	3	2	1	1	1	...	2	4	2	3
Nervous Diseases ...	1	2	1	3	...	3	...	1	1	1	2	...	2	...
Circulatory Diseases	4	2	8	4	2	18	8	3	1	8	3	3	15	21
Pneumonia ...	3	3	3	4	3	3	1	2	2	3	3	4	2	3
Other Respiratory Diseases.	1	2	...	...	1	1	1	1	1	...	...	1	1	3
Abscess of the liver...	11	21	18	19	12	18	8	8	15	19	15	17	15	21
Urinary Diseases ...	1	3	...	3	1	2	...	1	2	...	2	1	2	...
TOTAL ...	101	118	75	88	51	87	25	75	83	78	68	71	72	64
Heat-stroke ...	5	5	3	11	3	7	5	4	4	3	9	4	6	13
Suicide ...	2	6	2	2	4	3	2	1	4	2	2	6	2	5
Other injuries ...	14	5	7	9	3	11	...	10	4	7	7	4	9	...
All Causes ...	134	142	96	129	72	120	39	100	100	100	100	100	100	100

Causes of Death.	(e) NUMBER OF DEATHS.						(f) PERCENTAGE AT EACH AGE TO TOTAL NUMBER.					
	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.
Enteric Fever ...	5	154	49	13	3	...	2	69	22	6	1	...
Cholera ...	1	23	18	3	1	...	2	50	39	7	2	...
Abscess of the liver	...	25	64	13	5	...	...	23	60	12	5	...
Suicide ...	...	7	7	5	2	...	...	33	33	24	10	...
All Causes ...	9	340	256	85	32	10	1	46	35	12	4	1

Causes of Death.	(k) NUMBER OF DEATHS.							(l) PERCENTAGE IN EACH PERIOD OF RESIDENCE TO TOTAL NUMBER.						
	Under 1 year.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.	Under 1 year.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.
Enteric Fever ...	57	57	33	36	17	21	3	25	23	15	16	8	9	8
Cholera ...	6	13	5	11	4	6	1	13	28	11	24	9	13	2
Abscess of the liver	11	21	18	19	12	18	8	10	20	17	18	11	17	7
Suicide ...	2	6	2	2	4	3	2	10	29	10	10	19	14	10
All Causes ...	134	142	96	129	72	120	39	18	19	13	18	10	16	5

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TABLE VIII.—RELATION OF INVALIDING TO AGE AND LENGTH OF RESIDENCE IN INDIA.

A.—AGE.

(a) INVALIDED PER 1,000.

CAUSES OF INVALIDING.	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.
Dysentery	·42	·96	·81	·38	1·42	2·20
Intermittent and Remittent Fevers	1·27	1·60	2·17	2·66	2·85	4·41
Venereal Diseases	·42	1·66	2·42	1·90	1·42	...
Debility	3·39	2·95	3·06	5·56	12·81	13·22
Rheumatism	...	·42	·51	·38	1·42	...
Tubercle of the lungs	·42	1·02	1·44	2·53	·95	2·20
Mental Diseases	...	1·05	·85	·63	1·90	...
Epilepsy	...	·60	·68	·51	·95	...
Other Nervous Diseases	·42	·60	1·02	1·14	2·37	...
Eye, ear, and nose Diseases	1·27	2·59	1·87	1·01	·95	2·20
Palpitation	·85	1·90	1·32	·38	2·37	...
Valvular disease of the heart	...	1·60	1·95	2·02	·95	2·20
Other Circulatory Diseases	...	·90	·38	·63	·47	...
Respiratory Diseases	...	·57	·64	·38	·95	...
Congestion, Inflammation and Abscess of the liver	...	·75	2·51	2·66	3·32	6·61
Locomotive Diseases	1·70	1·14	·85	·51	·47	...
Injuries	...	1·24	·93	1·14	·95	...
All Causes	11·88	23·99	29·49	29·71	41·73	41·85

(b) LIABILITY IN PERCENTAGES.

CAUSES OF INVALIDING.	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.
Dysentery	7	16	13	6	23	36
Intermittent and Remittent Fevers	8	11	15	18	19	29
Venereal Diseases	5	21	31	24	18	...
Debility	8	7	7	14	31	32
Rheumatism	...	15	19	14	32	...
Tubercle of the lungs	5	12	17	30	11	26
Mental Diseases	...	24	19	14	43	...
Epilepsy	...	22	25	19	35	...
Other Nervous Diseases	8	11	18	21	42	...
Eye, ear, and nose Diseases	13	26	19	10	10	22
Palpitation	12	28	19	6	35	...
Valvular disease of the heart	...	18	22	23	11	25
Other Circulatory Diseases	...	38	16	26	20	...
Respiratory Diseases	...	27	25	15	37	...
Congestion, Inflammation and Abscess of the liver	...	5	16	17	21	42
Locomotive Diseases	6	24	18	11	10	...
Injuries	...	29	22	27	22	...
All Causes	7	15	16	16	23	23

B.—LENGTH OF RESIDENCE IN INDIA.

(g) INVALIDED PER 1,000.

CAUSES OF INVALIDING.	Under 1.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.
Dysentery	·54	·50	·75	·91	·81	1·73	2·01
Intermittent and Remittent Fevers	·14	1·27	1·34	1·74	1·78	6·73	5·70
Venereal Diseases	·34	1·34	2·35	2·65	2·26	3·83	1·34
Debility	1·16	1·84	2·94	3·15	4·37	7·13	19·44
Rheumatism	·14	·21	·42	·33	·97	1·45	·34
Tubercle of the lungs	1·02	·99	·50	1·24	1·62	3·30	2·35
Mental Diseases	·48	·92	·92	·91	·97	1·72	1·01
Epilepsy	·48	·57	·42	·33	·81	·92	2·01
Other Nervous Diseases	·41	·64	·50	·58	1·46	1·98	2·35
Eye, ear, and nose Diseases	1·84	2·90	1·34	1·58	1·46	3·56	1·68
Palpitation	·95	1·56	·75	1·49	1·62	3·43	1·68
Valvular disease of the heart	1·09	·71	·84	1·58	2·10	5·02	4·02
Other Circulatory Diseases	·34	·85	·67	·33	·81	·79	1·68
Respiratory Diseases	·34	·28	·50	·50	·97	1·19	1·01
Congestion, Inflammation and Abscess of the liver	·41	1·27	·67	1·58	2·10	4·49	5·70
Locomotive Diseases	·48	·99	1·26	·91	·97	1·19	1·68
Injuries	·75	·71	·67	·50	1·78	3·04	1·68
All Causes	14·44	22·07	20·88	26·45	33·96	63·37	70·75

(h) LIABILITY IN PERCENTAGES.

CAUSES OF INVALIDING.	Under 1.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.
Dysentery	7	7	10	13	11	24	28
Intermittent and Remittent Fevers	1	7	7	9	10	36	30
Venereal Diseases	2	9	17	19	16	27	9
Debility	3	5	7	8	11	18	49
Rheumatism	4	5	11	9	25	36	9
Tubercle of the lungs	9	9	5	11	15	30	21
Mental Diseases	7	13	13	13	14	25	15
Epilepsy	9	10	8	6	15	17	36
Other Nervous Diseases	5	8	6	7	18	25	30
Eye, ear, and nose Diseases	13	20	9	11	10	25	12
Palpitation	8	14	7	13	14	30	15
Valvular disease of the heart	7	5	5	10	14	33	26
Other Circulatory Diseases	6	16	12	6	15	14	31
Respiratory Diseases	7	6	10	10	20	25	21
Congestion, Inflammation and Abscess of the liver	3	8	4	10	13	28	35
Locomotive Diseases	6	13	17	12	13	16	22
Injuries	8	8	7	5	19	33	18
All Causes	6	9	8	11	13	25	28

(c) NUMBER INVALIDED.

CAUSES OF INVALIDING.	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.
Dysentery	1	32	19	3	3	1
Intermittent and Remittent Fevers	3	53	51	21	6	2
Venereal Diseases	1	55	57	15	3	...
Debility	8	98	72	44	27	6
Rheumatism	...	14	12	3	3	...
Tubercle of the lungs	1	34	38	20	2	1
Mental Diseases	...	35	20	5	4	...
Epilepsy	...	20	16	4	2	...
Other Nervous Diseases	1	20	24	9	5	...
Eye, ear, and nose Diseases	3	86	44	8	2	1
Palpitation	2	63	31	3	5	...
Valvular disease of the heart	...	53	46	16	2	1
Other Circulatory Diseases	...	30	9	5	1	...
Respiratory Diseases	...	19	15	3	2	...
Congestion, Inflammation and Abscess of the liver	...	25	59	21	7	3
Locomotive Diseases	4	38	20	4	1	...
Injuries	...	41	22	9	2	...
All Causes	28	929	694	235	88	19

(d) COMPOSITION OF 100 INVALIDINGS AT EACH AGE.

CAUSES OF INVALIDING.	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.
Dysentery	4	3	3	1	3	5
Intermittent and Remittent Fevers	11	6	7	9	7	11
Venereal Diseases	4	6	8	6	3	...
Debility	29	11	10	19	31	32
Rheumatism	...	2	2	1	3	...
Tubercle of the lungs	4	4	5	9	2	5
Mental Diseases	...	4	3	2	5	...
Epilepsy	...	2	2	2	2	...
Other Nervous Diseases	4	2	3	4	6	...
Eye, ear, and nose Diseases	11	9	6	3	2	5
Palpitation	7	7	4	1	6	...
Valvular disease of the heart	...	6	7	7	2	5
Other Circulatory Diseases	...	3	1	2	1	...
Respiratory Diseases	...	2	2	1	2	...
Congestion, Inflammation and Abscess of the liver	...	3	9	9	8	16
Locomotive Diseases	14	4	3	2	1	...
Injuries	...	4	3	7	2	...
All Causes	100	100	100	100	100	100

(e) NUMBER INVALIDED.

CAUSES OF INVALIDING.	Under 1.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.
Dysentery	8	7	9	11	5	13	6
Intermittent and Remittent Fevers	2	18	16	21	11	51	17
Venereal Diseases	5	19	28	32	14	29	4
Debility	17	26	35	38	27	54	58
Rheumatism	2	3	5	4	6	11	1
Tubercle of the lungs	15	14	6	15	10	25	2
Mental Diseases	7	13	11	11	6	13	3
Epilepsy	7	8	5	4	5	7	0
Other Nervous Diseases	6	9	6	7	9	15	7
Eye, ear, and nose Diseases	27	41	16	19	9	27	5
Palpitation	14	22	9	18	10	26	5
Valvular disease of the heart	16	10	10	19	13	38	12
Other Circulatory Diseases	5	12	8	4	5	6	5
Respiratory Diseases	5	4	6	6	6	9	3
Congestion, Inflammation and Abscess of the liver	6	18	8	19	13	34	17
Locomotive Diseases	7	14	15	11	6	9	5
Injuries	11	10	8	6	11	23	5
All Causes	212	312	249	319	210	480	211

(f) COMPOSITION OF 100 INVALIDINGS IN EACH PERIOD OF RESIDENCE.

CAUSES OF INVALIDING.	Under 1.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.
Dysentery	4	2	4	3	2	3	3
Intermittent and Remittent Fevers	1	6	6	7	5	11	8
Venereal Diseases	2	6	11	10	7	6	2
Debility	8	8	14	12	13	11	27
Rheumatism	1	1	2	1	2	2	0
Tubercle of the lungs	7	4	2	5	5	5	3
Mental Diseases	3	4	4	3	3	3	2
Epilepsy	3	3	2	1	2	1	3
Other Nervous Diseases	3	3	2	2	4	3	3
Eye, ear, and nose Diseases	13	13	6	6	4	6	2
Palpitation	7	7	4	6	5	5	2
Valvular disease of the heart	8	3	4	6	6	8	6
Other Circulatory Diseases	2	4	3	2	2	1	2
Respiratory Diseases	2	1	2	2	3	2	1
Congestion, Inflammation and Abscess of the liver	3	6	3	6	6	7	8
Locomotive Diseases	4	7	6	3	3	2	2
Injuries	5	5	3	3	2	5	2
All Causes	100	100	100	100	100	100	100

(i) PERCENTAGE AT EACH AGE TO TOTAL NUMBER.

CAUSES OF INVALIDING.	Under 20.	20 and less than 25.	25 and less than 30.	30 and less than 35.	35 and less than 40.	40 and upwards.
Intermittent and Remittent Fevers	3	53	51	21	6	2
Venereal Diseases	1	55	57	15	3	...
Debility	8	98	72	44	27	6
All Causes	28	929	694	235	88	19

(k) NUMBER INVALIDED.

CAUSES OF INVALIDING.	Under 1.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.
Intermittent and Remittent Fevers	2	18	16	21	11	51	17
Venereal Diseases	5	19	28	32	14	29	4
Debility	17	26	35	38	27	54	58
All Causes	212	312	249	319	210	480	211

(l) PERCENTAGE IN EACH PERIOD OF RESIDENCE TO TOTAL NUMBER.

CAUSES OF INVALIDING.	Under 1.	1 and less than 2.	2 and less than 3.	3 and less than 4.	4 and less than 5.	5 and less than 10.	10 and upwards.
Intermittent and Remittent Fevers	1	13	12	15	8	37	12
Venereal Diseases	4	15	21	24	11	22	3
Debility	7	10	14	15	11	21	23
All Causes	12	16	12	16	11	24	11

European Troops.

Table IX.—Statistics of Officers.

A.—Sickness and Mortality among Officers of the British Army in 1906. (From the Medical Returns of the Army.)

	Northern Command.		Western Command.		Eastern Command.		Secunderabad Division.		Burma Division.		India.*	
Strength,	562		655		558		276		102		2,225	
Cases remaining from 1905	29		16		17		7		3		72	
	Ratios.	Actuals.	Ratios.	Actuals.	Ratios.	Actuals.	Ratios.	Actuals.	Ratios.	Actuals.	Ratios.	Actuals.
Constantly sick	27·8	15·65	28·8	18·89	35·0	19·54	37·5	10·35	22·5	2·30	30·0	66·82
Invalids	62·28	35	73·48	48	48·39	27	94·20	26	19·61	2	62·02	138
Admissions.												
Influenza	49·8	28	21·4	14	57·3	32	7·2	2	...	...	34·2	76
Cholera	...	...	3·1	2	1·8	1	3·6	1	19·6	2	2·7	6
Small-pox	1·8	1	4·6	3	...	...	...	...	...	...	1·8	4
Enteric Fever	28·5	16	48·9	32	25·1	14	61·6	17	...	...	35·5	79
Intermittent Fever	128·1	72	142·0	93	163·1	91	54·3	15	107·8	11	129·0	287
Remittent Fever	5·3	3	4·6	3	...	...	...	...	9·8	1	3·1	7
Simple Continued Fever	69·4	39	64·1	42	28·7	16	32·6	9	176·5	18	56·2	125
Tubercle of the lungs	1·8	1	...	...	3·6	2	...	...	...	...	1·3	3
Pneumonia	3·6	2	...	...	3·6	2	...	...	...	...	1·8	4
Other Respiratory Diseases	30·2	17	15·3	10	25·1	14	18·1	5	9·8	1	21·1	47
Dysentery	1·8	1	26·0	17	21·5	12	29·0	8	...	...	17·5	39
Diarrhœa	33·8	19	29·0	19	32·3	18	14·5	4	19·6	2	27·9	62
Hepatic Abscess	...	...	3·1	2	...	...	...	...	...	...	·9	2
,, Congestion and Inflammation	33·8	19	19·8	13	32·3	18	21·7	6	19·6	2	26·1	58
Venereal Diseases	1·8	1	1·5	1	1·8	1	3·6	1	...	...	1·8	4
All causes.	715·3	402	726·7	476	838·7	468	644·9	178	823·5	84	728·1	1,620
Deaths.												
Cholera	...	...	3·05	2	1·79	1	3·62	1	19·61	2	2·70	6
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...
Enteric Fever	5·34	3	7·63	5	3·58	2	7·25	2	...	...	6·29	14
Intermittent Fever	...	...	...	..	...	...	...	...	...	...	...	...
Remittent Fever	...	...	...	...	...	...	...	...	...	...	...	...
Simple Continued Fever	...	...	...	...	...	...	...	...	...	...	...	...
Heat-stroke	...	...	...	...	...	...	...	...	...	...	·45	1
Circulatory Diseases	...	...	3·05	2	...	...	...	...	...	...	·90	2
Tubercle of the lungs	...	...	...	...	...	...	...	...	...	...	...	...
Pneumonia	1·78	1	...	...	...	...	...	...	...	...	·45	1
Other Respiratory Diseases	...	...	...	...	...	...	...	...	...	...	...	...
Dysentery	...	...	1·53	1	...	...	...	...	...	...	·45	1
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	...
Hepatic Abscess	...	...	1·53	1	...	...	...	...	...	...	·90	2
All causes	8·90	5	24·43	16	12·54	7	10·87	3	19·61	2	17·53	39
Deaths out of hospital	...	...	3·05	2	1·79	1	...	...	...	...	3·15	7

* Including officers on the line of march and with the Field Force.

B.—Causes of Death among European Officers of the British and Indian Armies in 1906. (From non-medical sources.)

Armies.	Strength in India, whether on leave or not, on the 1st of July 1906.	Strength in Europe or beyond sea on 1st July 1906, whether on furlough or sick leave.	In India.													Deaths in England and other countries.	Deaths at sea.	Grand total.	Ratio per 1,000.
			Cholera.	Small-pox.	Enteric Fever.	Intermittent Fever.	Remittent Fever.	Simple Continued Fever	Heat-stroke.	Circulatory Diseases.	Tubercle of the lungs.	Pneumonia.	Other Respiratory Diseases.	Dysentery.	Diarrhœa.	Hepatic Abscess.	Total.				
British	2,938	627	6	...	14	...	...	...	1	2	...	1	...	1	...	2	39	5	...	44	12·34
Indian	3,213	776	1	1	2	...	1	...	1	1	...	...	...	2	...	5	21	7	1	29	6·27

NATIVE TROOPS.

TABLE X—SUMMARY, SICKNESS AND MORTALITY.

A.—COMMANDS AND DIVISIONS.	Years.	Average strength.	RATIO PER MILLE OF STRENGTH. Admissions into hospital.	Constantly sick.	Deaths from: Cholera.	Small-pox.	Enteric fever.	Remittent fever.	Tubercle of the lungs.	Pneumonia.	Dysentery.	Abscess of the liver.	All causes.	Mortality in cluding absent deaths.
Northern Command ...	1905	36,696	652	26	·03	...	·27	·76	·76	3·32	·19	...	12·92	14·00
	1906	40,535	791	25	·07	...	·32	·37	·67	2·24	·10	·05	6·49	6·80
Western Command ...	1905	33,932	602	23	...	...	·21	·32	·47	1·74	·18	·03	6·66	8·10
	1906	34,972	743	24	·63	·09	·29	·26	·23	1·69	·29	·09	8·09	8·81
Eastern Command ...	1905	21,823	572	23	·18	...	·60	·64	·55	1·33	·18	...	6·42	8·39
	1906	21,918	647	25	·46	·05	·18	·30	·91	1·28	·23	·05	6·93	8·08
1st (Peshawar) Division ...	1905	9,065	526	20	...	...	·22	·66	·44	2·87	·33	...	7·17	10·92
	1906	9,859	782	23	...	...	·10	·61	·30	2·43	·20	...	5·08	9·03
2nd (Rawalpindi) „ ...	1905	8,647	785	32	·12	...	·81	·81	1·27	3·12	·35	...	8·10	12·84
	1906	10,800	790	28	...	...	·46	·19	1·39	2·69	·19	·09	7·41	9·26
3rd (Lahore) „ ...	1905	9,157	518	27	...	...	·11	·98	·76	2·51	·11	...	27·85	33·53
	1906	11,336	466	18	·26	...	·26	·62	·53	1·32	...	·05	5·38	9·44
4th (Quetta) „	1905	7,679	710	26	...	...	·13	·13	·65	2·08	·26	...	5·73	9·25
	1906	7,513	791	25	·13	·13	·13	·27	·13	1·46	·87	·13	4·92	8·39
5th (Mhow) „ ...	1905	15,737	586	22	...	...	·25	·44	·44	1·84	·19	...	6·74	9·79
	1906	16,115	778	24	·43	·06	·50	·37	·25	1·99	·12	...	8·38	11·17
6th (Poona) „ ...	1905	9,668	500	20	..	...	·21	·21	·31	1·24	...	·10	6·00	9·52
	1906	9,538	575	20	1·47	·10	·10	...	...	1·57	·21	·21	9·65	12·58
7th (Meerut) „ ...	1905	10,212	501	24	...	...	1·18	·98	·69	1·47	·20	...	7·25	9·20
	1906	11,474	543	27	·35	...	·69	·44	1·22	1·22	...	...	6·36	10·20
8th (Lucknow) „ ...	1905	11,011	633	22	·34	...	·09	·34	·43	1·21	·17	...	5·68	9·73
	1906	10,444	651	22	·57	·10	·29	·57	·57	1·34	·48	·10	7·56	10·72
9th (Secunderabad) „ ...	1905	11,794	466	19	·17	·08	·34	...	·08	1·27	·17	...	5·77	6·29
	1906	10,603	524	20	2·26	...	·66	·28	·19	1·04	·19	·19	7·73	7·29
Burma „ ...	1905	4,793	614	26	...	...	...	·63	·83	·63	...	...	6·47	9·81
	1906	5,310	644	26	...	...	...	·38	·19	·19	...	·19	4·14	7·59
Kohat, Derajat and Bannu Brigades.	1905	8,693	797	30	...	...	...	·69	·69	4·83	...	...	9·20	3·80
	1906	8,540	1,231	36	...	...	·47	...	·35	2·69	...	...	5·85	8·55
Aden Brigade	1905	848	1,096	65	...	...	...	1·18	1·18	2·36	1·18	...	18·87	18·87
	1906	1,806	1,122	37	...	...	...	...	1·66	·55	·55	...	9·41	9·97
India	1905	123,434	607	23	·06	·01	·28	·56	·50	1·90	·18	·01	8·09	9·50
	1906	127,853	684	23	·48	·03	·27	·34	·52	1·56	·20	·09	6·57	8·58

B.—GEOGRAPHICAL GROUPS.	Years.	Average strength.*	RATIO PER MILLE OF STRENGTH. Admissions.	Constantly sick.	Admissions from: Influenza.	Cholera.	Small-pox.	Enteric fever.	Intermittent fever.	Remittent fever.	Simple continued fever.	Pneumonia.	Dysentery.	Venereal diseases.
Group I.—Burma Coast and Bay Islands.	1891-1900	1,891	794	37	2·7	·1	·2	...	195·2	6·6	4·3	5·0	66·4	55·5
	1905	1,195	625	24	4·2	...	...	...	168·2	5·0	52·7	2·5	52·7	10·9
	1906	1,349	485	18	...	...	·7	...	168·2	·7	71·9	3·0	5·2	8·2
„ II.—Burma Inland ...	1891-1900	6,083	1,165	50	2·9	1·7	·1	·1	576·6	10·2	7·2	4·7	71·5	47·8
	1905	2,916	539	22	...	...	...	...	159·5	8·6	4·5	1·7	23·7	12·2
	1906	2,836	674	26	...	...	...	·4	222·5	1·1	40·2	2·1	15·5	16·6
„ III.—Assam ...	1891-1900	2,003	1,209	51	9·2	3·0	·4	3·8	512·1	16·5	6·6	9·4	100·0	71·2
	1905	949	751	25	...	...	...	...	213·9	2·1	...	5·3	40·0	26·3
	1906	954	775	25	...	...	...	...	302·9	2·1	8·4	7·3	45·1	32·5
„ IV.—Bengal and Orissa ...	1891-1900	2,935	1,120	44	4·7	·4	·3	·2	511·2	15·0	6·7	5·9	86·1	85·6
	1905	2,558	877	27	11·3	...	...	...	353·8	24·6	21·1	10·9	95·4	19·5
	1906	1,816	876	33	2·2	·6	·6	1·7	303·4	6·1	20·4	5·5	43·5	30·8
„ V.—Gangetic Plain and Chutia Nagpur.	1891-1900	6,463	668	28	7·8	1·6	·3	·3	215·4	12·5	2·8	7·6	42·3	33·7
	1905	7,046	506	18	1·1	·6	...	·3	119·8	9·2	13·1	5·3	35·1	13·9
	1906	6,209	564	18	10·0	·5	·2	·2	140·9	3·4	18·5	6·9	33·3	11·9
„ VI.—Upper Sub-Himalaya.	1891-1900	15,166	732	29	2·9	1·0	·6	·2	280·8	17·9	3·1	15·0	29·8	33·7
	1905	16,649	512	23	2·6	...	·4	2·9	111·4	8·8	5·3	15·4	24·3	19·5
	1906	20,842	600	22	3·3	·4	·4	1·3	227·7	4·8	14·9	10·3	28·3	15·8
„ VII.—North-Western Frontier, Indus Valley, and North-Western Rajputana.	1891-1900	15,459	1,102	36	8·9	2·3	·6	·2	507·5	22·2	10·3	29·4	56·5	22·5
	1905	17,916	654	25	4·0	...	·7	·7	170·8	9·9	7·0	20·5	39·5	14·7
	1906	19,224	938	27	16·2	·2	·5	1·2	468·3	7·3	17·0	10·0	49·2	8·5
„ VIII.—South-Eastern Rajputana, Central India and Gujarat.	1891-1900	12,679	814	27	6·0	1·6	·7	·1	337·5	11·3	12·3	13·1	29·9	41·5
	1905	13,651	583	21	1·0	·2	1·4	·7	211·8	3·4	6·8	14·7	18·1	18·0
	1906	13,243	767	23	3·2	·7	1·8	·9	355·3	3·9	13·4	10·1	40·7	14·6
„ IX.—Deccan ...	1891-1900	19,504	736	27	7·0	1·9	1·3	·1	292·6	11·2	11·6	9·3	31·3	43·0
	1905	15,977	445	18	·2	...	1·3	1·1	73·2	2·4	20·7	6·6	25·0	24·3
	1906	16,591	579	21	3·7	3·8	1·1	2·0	110·0	3·3	43·6	8·0	39·2	20·3
„ X.—Western Coast ...	1891-1900	3,055	714	29	2·2	·3	·5	·4	159·9	14·9	26·8	6·7	60·5	53·3
	1905	1,978	606	29	...	...	4·0	·5	192·6	1·5	10·6	13·7	20·7	38·4
	1906	1,783	894	25	...	...	·6	...	260·8	1·1	4·5	5·6	101·0	11·8
„ XI.—Southern India ...	1891-1900	8,244	565	29	3·5	2·5	·6	·1	137·0	3·6	21·7	7·9	20·1	43·2
	1905	5,967	552	21	·5	·5	·2	·2	122·2	·8	57·3	5·0	19·9	30·5
	1906	4,282	605	20	2·8	·7	1·6	1·4	166·0	1·6	37·8	6·1	42·7	23·8
„ XII.—Hill Stations ...	1891-1900	17,027	1,075	40	21·3	1·0	·3	·6	470·0	24·6	8·4	20·5	53·3	49·6
	1905	20,224	729	31	·3	·0	·0	1·6	170·3	11·5	23·4	13·7	32·3	24·3
	1906	22,403	735	28	3·8	...	·2	·8	250·0	6·5	66·2	12·8	33·6	20·2
„ INDIA	1891-1900	127,666	852	32	8·1	1·8	·5	·3	348·8	15·2	9·1	14·4	48·8	37·2
	1905	123,434	607	23	1·5	·1	·6	1·1	171·2	8·4	14·3	12·5	32·5	19·6
	1906	127,853	684	23	5·2	·7	·6	1·0	261·8	5·0	29·6	9·0	37·1	16·2

* The decennial ratios are worked on the total strength of the ten years period.

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TABLE XI.—RATIOS OF COMMANDS.

	Ratio per 1,000 of the Average Strength.					
	Northern Command.	Western Command.	Eastern Command.	Secunderabad Division.	Burma Division.	Army of India.
I.—AVERAGE ANNUAL STRENGTH	40,535	34,972	21,918	10,603	5,310	127,853
II.—CONSTANTLY SICK RATE OF EACH MONTH—						
January	27·1	23·1	22·9	18·9	24·8	22·6
February	24·0	21·1	21·1	20·2	25·1	21·2
March	18·0	19·1	18·5	17·7	24·0	18·5
April	16·3	18·8	21·5	17·0	23·5	18·4
May	18·6	18·6	22·9	19·1	20·1	18·9
June	19·4	18·4	20·8	21·8	25·1	19·4
July	18·0	20·4	25·3	21·8	27·1	20·4
August	20·4	23·2	24·8	20·8	27·7	21·8
September	24·3	28·4	27·3	19·5	32·0	24·7
October	31·5	29·6	28·1	20·1	28·7	26·9
November	45·9	32·4	30·8	23·5	27·0	31·7
December	49·7	29·8	34·6	18·4	25·9	28·7
OF THE YEAR	25·4	23·8	24·7	19·7	26·0	23·0
III.—ADMISSION RATE OF THE YEAR—						
Influenza	7·5	4·7	7·5	2·0	...	5·2
Cholera	·1	·1	·4	3·7	...	·7
Small-pox	·3	1·4	·2	·9	·2	·6
Enteric Fever	1·4	·8	·7	2·3	·2	1·0
Intermittent Fever	329·2	360·6	226·7	95·6	468·0	261·8
Remittent Fever	6·0	4·4	3·6	1·6	9·2	5·0
Simple Continued Fever	46·5	18·7	15·8	43·6	41·8	29·6
Tubercle of the lungs	3·3	2·1	2·6	1·4	1·9	2·5
Pneumonia	11·7	9·8	7·9	5·9	2·8	9·0
Other Respiratory Diseases	28·1	24·0	20·3	17·2	26·9	22·9
Dysentery	37·5	40·0	34·1	50·3	23·0	37·1
Diarrhœa	6·1	7·9	8·4	11·6	5·8	7·2
Hepatic { Abscess	·1	·2	·1	·3	·4	·1
Hepatic { Congestion and Inflammation	·3	·6	1·2	·6	·4	·6
Scurvy	·8	4·4	2·5	2·1	·2	2·4
Venereal Diseases	11·1	19·6	22·9	19·1	20·0	16·2
ALL CAUSES	790·5	743·3	647·0	524·4	643·7	683·5
IV.—DEATH RATE OF THE YEAR—						
Cholera	·07	·63	·46	2·26	...	·48
Small-pox	...	·09	·05	...	...	·03
Enteric Fever	·32	·29	·18	·66	...	·27
Intermittent Fever	·27	·29	·26	·09	·38	·31
Remittent Fever	·37	·26	·50	·28	·38	·34
Simple Continued Fever	...	·03	...	·28	·19	·04
Circulatory Diseases	·12	·37	·32	·57	...	·25
Tubercle of the lungs	·67	·23	·91	·19	·19	·52
Pneumonia	2·24	1·69	1·28	1·04	·19	1·56
Other Respiratory Diseases	·07	·09	·36	·09	·19	·13
Dysentery	·10	·29	·23	·19	...	·20
Diarrhœa	·05	·06	·27	...	...	·08
Hepatic Abscess	·05	·09	·05	·19	·19	·09
Anæmia and Debility	...	·09	·05	·09	...	·04
ALL CAUSES	6·19	8·09	6·93	7·73	4·14	6·57
V.—PERCENTAGE IN 100 ADMISSIONS—						
Influenza	·95	·63	1·16	·38	...	·77
Cholera	·01	·15	·06	·20	...	·11
Small-pox	·04	·18	·04	·18	·03	·09
Enteric Fever	·17	·11	·11	·43	·03	·15
Intermittent Fever	41·65	49·45	35·04	18·11	26·10	38·31
Remittent Fever	·76	·60	·56	·31	1·43	·72
Simple Continued Fever	5·88	2·51	2·44	·31	6·50	4·32
Tubercle of the lungs	·42	·28	·39	·27	·29	·37
Pneumonia	1·49	1·32	1·23	1·13	·44	1·32
Other Respiratory Diseases	3·55	3·22	3·14	3·37	4·18	3·36
Dysentery	4·74	5·38	5·28	9·89	3·57	5·43
Diarrhœa	·77	1·06	1·30	2·21	·91	1·06
Hepatic { Abscess	·01	·02	·02	·05	·06	·02
Hepatic { Congestion and Inflammation	·04	·08	·18	·11	·06	·08
Scurvy	·10	·39	·39	·40	·03	·35
Venereal Diseases	2·46	2·64	3·54	3·63	3·10	2·37
VI.—PERCENTAGE IN 100 DEATHS—						
Cholera	1·4	7·8	6·6	29·3	...	7·4
Small-pox	...	1·1	·7	...	...	·5
Enteric Fever	5·8	3·5	2·6	8·5	...	4·0
Intermittent Fever	4·4	3·5	6·6	1·2	9·1	4·6
Remittent Fever	6·0	3·2	7·2	3·7	9·1	5·1
Simple Continued Fever	...	·4	...	3·7	4·5	·6
Circulatory Diseases	2·9	4·6	4·6	7·3	...	3·8
Tubercle of the lungs	10·8	2·8	13·2	2·4	6·5	8·0
Pneumonia	36·3	20·8	18·4	13·4	4·5	23·7
Other Respiratory Diseases	1·2	1·1	5·3	1·2	4·5	1·9
Dysentery	4·6	3·5	3·3	2·4	...	3·1
Diarrhœa	·8	·7	3·9	...	...	1·2
Hepatic Abscess	·8	1·1	·7	2·4	4·5	1·2
Anæmia and Debility	...	·1	·2	1·2	...	·5

NATIVE TROOPS.

TABLE XII.—RATIOS OF GEOGRAPHICAL GROUPS.

	RATIO PER 1,000 OF THE AVERAGE STRENTGH.												
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
	Burma Coast and Bay Islands.	Burma Inland.	Assam.	Bengal and Orissa.	Gangetic Plain and Chutia Nagpur.	Upper Sub-Himalayas.	N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	S.-E. Rajputana, Central India, and Gujarat.	Deccan.	Western Coast.	Southern India.	Hill Stations.	Army of India.
I.—AVERAGE ANNUAL STRENGTH	1,349	2,836	954	2,826	6,209	20,842	19,224	13,243	16,591	1,783	4,282	22,403	127,883
II.—CONSTANTLY SICK-RATE OF EACH MONTH—													
January	10·5	27·5	22·9	33·9	16·5	20·2	33·4	24·6	19·0	21·5	20·0	26·7	22·6
February	11·2	26·8	20·8	31·5	16·2	17·3	29·3	19·3	19·7	22·0	21·1	25·9	21·2
March	12·5	23·4	19·6	23·4	14·8	14·7	19·8	14·8	20·7	20·0	17·1	21·9	18·5
April	14·3	18·2	17·3	23·4	14·8	12·5	14·7	14·4	20·4	18·5	19·6	21·6	18·4
May	9·5	19·3	28·6	25·0	13·7	10·3	17·7	15·7	19·5	20·1	26·2	23·2	18·9
June	22·6	25·0	20·1	21·9	13·7	20·6	18·0	14·9	16·9	24·9	31·8	22·8	19·4
July	20·4	23·4	39·0	25·9	17·9	29·6	18·0	17·3	20·2	25·1	24·9	22·9	20·4
August	25·5	30·2	29·6	35·0	17·8	19·6	19·4	21·8	21·9	27·0	15·7	26·5	21·8
September	25·5	35·3	20·9	39·7	20·4	23·7	21·5	27·5	22·8	21·8	11·7	34·2	24·7
October	18·7	31·2	30·0	36·2	25·9	27·7	30·5	30·6	24·8	27·9	14·1	33·8	26·9
November	17·6	29·7	29·3	48·7	24·3	34·6	48·8	37·2	24·3	33·9	24·9	36·7	31·7
December	16·0	26·5	23·0	50·3	20·1	30·4	45·9	32·4	22·9	46·2	17·5	39·2	28·7
OF THE YEAR	17·3	26·4	25·2	32·5	18·0	21·2	26·9	23·3	21·2	25·2	20·1	27·8	23·0
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	...	...	2·2	10·0	3·3	16·2	3·2	3·7	...	2·8	3·8	5·2
Cholera	...	...	...	·6	·5	·4	·2	·7	3·8	...	·7	...	·7
Small-pox	·7	...	...	·6	·2	·4	·5	1·8	1·1	·6	1·6	·2	·6
Enteric Fever	...	·4	...	1·9	·2	1·5	1·7	·6	2·0	...	1·4	·8	1·0
Intermittent Fever	108·2	222·5	302·9	303·4	140·9	227·7	468·3	355·3	110·0	260·8	166·0	250·0	261·8
Remittent Fever	·7	1·1	2·1	6·1	3·4	4·8	7·3	3·9	3·3	1·1	1·6	6·5	5·0
Simple Continued Fever	71·3	40·2	8·4	29·4	18·5	14·9	17·0	13·4	43·6	4·5	37·8	66·2	29·6
Tubercle of the lungs	1·5	2·1		·6	1·6	3·2	2·4	2·3	1·0	9·0	2·1	3·6	2·5
Pneumonia	3·0	2·1	7·3	5·5	6·9	10·3	16·0	10·1	8·0	5·6	6·1	12·8	9·0
Other Respiratory Diseases	31·1	30·0	26·2	41·3	18·2	24·7	25·1	19·8	18·4	26·9	19·4	34·3	22·9
Dysentery	5·2	15·5	45·1	43·5	33·3	28·2	49·2	40·7	39·2	101·0	42·7	33·6	32·1
Diarrhœa	8·2	2·8	26·2	22·1	7·6	4·5	7·4	6·9	10·7	35·9	3·5	7·1	7·2
Hepatic { Abscess	...	·4	...	...	·2	·6	·1	·2	·3	·6	·2	·1	·1
Hepatic { Congestion and Inflammation	1·5	...	...	4·4	1·4	·6	·1	·4	1·0	·6	·5	·4	·6
Scurvy	...	·4	...	4·4	2·6	·8	1·2	2·3	2·3	8·4	1·2	4·0	2·4
Venereal Diseases	8·2	16·6	32·5	30·8	11·9	15·8	8·5	14·6	26·3	11·8	23·8	20·2	16·2
ALL CAUSES	484·8	674·2	772·6	876·1	564·0	599·5	937·9	767·2	578·9	804·3	605·1	734·5	685·5
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	1·65	·48	·34	·05	·23	2·35	...	·70	...	·48
Small-pox	...	...	...	...	·16	...	...	...	·12	...	...	·04	·03
Enteric Fever	...	...	...	·55	...	·34	·31	·53	·48	...	·23	·18	·27
Intermittent Fever	·74	·35	...	1·10	·16	·38	·21	·53	·18	·56	...	·27	·31
Remittent Fever	...	...	1·05	·55	·48	·43	·31	·30	·36	...	...	·45	·34
Simple Continued Fever	·74	...	...	...	...	...	...	...	·12	·56	...	·04	·04
Circulatory Diseases	...	...	...	...	·16	·14	·05	·23	·30	1·68	·93	·40	·25
Tubercle of the lungs	...	·35	...	·55	·48	·43	·31	·30	·06	...	·23	1·29	·32
Pneumonia	·74	...	1·05	1·65	1·45	1·87	2·03	2·19	1·33	2·80	·47	1·74	1·56
Other Respiratory Diseases	...	·35	...	1·10	·32	·14	·16	·08	·06	...	...	·09	·13
Dysentery	...	...	...	...	·81	·05	·16	·15	...	1·12	·47	·22	·20
Diarrhœa	...	...	...	·55	·16	·19	...	...	·36	...	...	·13	·08
Hepatic Abscess	...	...	...	...	·16	·05	...	...	·18	...	·23	·13	·09
Anæmia and Debility	...	...	...	...	...	...	...	·15	·06	...	...	·04	·04
ALL CAUSES	4·45	3·53	2·10	9·91	7·25	6·19	5·20	8·08	9·22	12·90	6·31	6·83	6·57
V.—PERCENTAGE IN 100 ADMISSIONS—													
Influenza	...	...	...	·25	1·77	·55	1·73	·47	·64	...	·46	·52	·77
Cholera	...	...	...	·06	·09	·06	·02	·09	1·06	...	·12	...	·13
Small-pox	·15	...	...	·06	·03	·07	·05	·24	·20	·07	·27	·03	·09
Enteric Fever	...	·05	...	·19	·03	·22	·13	·12	·35	...	·23	·10	·15
Intermittent Fever	22·32	33·00	39·11	34·63	24·99	37·98	49·93	46·31	19·00	32·43	27·44	34·04	38·31
Remittent Fever	·15	·18	·27	·69	·60	·81	·78	·51	·57	·14	·27	·89	·72
Simple Continued Fever	14·83	5·96	1·08	2·33	3·28	2·49	1·81	1·75	7·53	·56	6·25	9·01	4·32
Tubercle of the lungs	·31	·31	...	·06	·29	·54	·26	·30	·17	1·12	·35	·49	·37
Pneumonia	·61	·31	·95	·63	1·23	1·71	·06	1·32	1·39	·70	1·06	1·74	1·32
Other Respiratory Diseases	6·42	4·45	3·38	4·71	3·23	3·95	2·67	2·58	3·18	3·35	3·20	4·67	3·36
Dysentery	1·07	2·30	5·82	4·97	1·91	4·71	5·24	5·31	6·78	12·55	7·06	4·58	5·43
Diarrhœa	1·68	·42	3·38	1·38	1·34	·75	·79	·91	1·85	4·46	·58	·97	1·06
Hepatic { Abscess	...	·05	...	...	·03	·01	·01	·02	·05	·07	·04	·02	·02
Hepatic { Congestion and Inflammation	·31	...	...	·50	·26	·10	·01	·05	·17	·07	·08	·06	·08
Scurvy	...	·05	...	·50	·46	·13	·13	·21	·60	1·05	·19	·55	·38
Venereal Diseases	1·68	2·46	4·19	3·32	2·11	2·63	·91	2·91	4·55	1·46	3·94	2·75	2·37
VI.—PERCENTAGE IN 100 DEATHS—													
Cholera	...	...	...	16·7	16·7	5·4	1·0	2·8	25·5	..	11·1	...	7·4
Small-pox	...	...	...	...	2·2	...	...	...	1·3	...	...	·7	·5
Enteric Fever	...	...	...	5·6	...	5·4	6·0	6·5	5·2	...	3·7	2·6	4·0
Intermittent Fever	16·7	10·0	...	11·1	2·2	6·2	4·0	6·5	2·0	4·3	...	3·9	4·6
Remittent Fever	...	...	50·0	5·6	6·7	7·0	6·0	3·7	3·9	...	...	6·5	5·3
Simple Continued Fever	16·7	...	...	...	...	...	...	...	1·3	4·3	...	·7	·6
Circulatory Diseases	...	...	...	...	2·2	2·3	1·0	2·8	3·3	13·0	14·8	5·9	3·8
Tubercle of the lungs	...	10·0	...	5·6	6·7	7·0	6·0	3·7	·7	...	3·7	19·0	8·0
Pneumonia	16·7	...	50·0	16·7	20·0	30·2	39·0	27·1	14·4	21·7	7·4	25·5	23·7
Other Respiratory Diseases	...	10·0	...	11·1	4·4	2·3	3·0	·9	·7	...	...	1·3	1·9
Dysentery	...	...	...	...	11·1	·8	3·0	1·9	...	8·7	7·4	3·3	3·1
Diarrhœa	...	...	...	5·6	2·2	3·1	...	...	...	4·3	...	2·0	1·2
Hepatic Abscess	...	...	...	...	2·2	·8	...	...	2·0	...	3·7	2·0	1·4
Anæmia and Debility	...	...	...	...	...	...	...	1·9	·7	...	...	·7	·6

* Including Group Extra India.

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TABLE XIII.—SICKNESS AND MORTALITY IN PLAINS AND HILLS (1.—ACTUALS: 2.—RATIOS).

	C. Plains and Hills.	Average annual strength.	Intermittent Fever.		Remittent Fever.		Tubercle of the lungs.		Pneumonia.		Other respiratory diseases.		Dysentery and Diarrhœa.		Scurvy.		Anæmia and Debility.		All causes.		Average number constantly sick.
			A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	
1902.	Plains ...	99,841	26,587	90	1,094	119	333	53	2,456	351	2,401	30	5,150	57	220	2	2,272	14	69,816	2,079	2,523
			266·3	1·90	10·9	1·19	3·3	·53	14·6	3·52	24·0	·30	51·6	·57	2·2	·02	12·7	·14	699·3	10·81	25·3
	Hills ...	20,950	6,887	18	388	23	196	46	429	107	576	12	1,485	12	82	...	461	7	17,218	287	681
			328·7	·86	18·5	1·10	9·4	2·20	20·5	5·11	27·5	·57	70·9	·57	3·9	...	22·0	·33	821·9	13·70	32·5
	Hills above 5,000 feet sea-level.	8,553	1,445	7	167	14	50	16	125	18	191	4	430	7	27	...	116	2	5,183	91	240
			165·4	·82	19·5	1·64	5·8	1·87	14·6	2·10	22·3	·47	50·3	·82	3·2	...	12·9	·23	606·0	10·64	28·1
	Hills below 5,000 feet sea-level.	12,397	5,472	11	221	9	146	30	304	89	385	8	1,055	5	55	...	351	5	12,035	196	441
			441·4	·89	17·8	·73	11·8	2·42	24·5	7·18	31·1	·65	85·1	·40	4·4	...	28·3	·40	970·8	15·86	35·6
1903.	Plains ...	100,869	24,204	60	856	94	369	46	1,340	273	2,222	22	4,225	38	179	8	1,484	8	64,066	944	2,349
			240·0	·59	8·5	·93	3·7	·46	13·3	2·75	21·0	·22	41·9	·38	1·8	·08	10·2	·08	641·0	9·36	2·33
	Hills ...	21,676	5,898	16	219	16	350	35	448	202	611	4	1,156	11	120	11	328	5	16,466	238	733
			272·1	·74	10·1	·74	16·1	1·61	20·7	4·71	28·2	·18	53·3	·51	5·5	·51	15·1	·23	759·6	13·06	33·8
	Hills above 5,000 feet sea-level.	9,900	1,455	4	105	3	50	18	137	16	213	1	357	4	20	...	99	1	5,673	82	255
			147·0	·40	10·6	·30	5·1	1·82	13·8	1·62	21·5	·10	36·1	·40	2·0	...	10·0	·10	573·0	8·28	25·8
	Hills below 5,000 feet sea-level.	11,776	4,443	12	114	13	300	17	311	86	398	3	799	7	100	11	229	4	10,793	201	478
			377·3	1·02	9·7	1·10	25·5	1·44	26·4	7·30	33·8	·25	67·8	·59	8·5	·93	19·4	·34	916·5	17·07	40·6
1904.	Plains ...	98,289	17,182	32	605	53	340	25	1,048	190	1,924	23	3,476	20	324	1	1,283	12	56,276	692	2,151
			174·8	·33	6·2	·54	3·5	·25	10·7	1·93	19·6	·23	35·4	·20	3·3	·01	13·1	·12	572·6	7·04	21·9
	Hills ...	20,369	4,590	10	226	20	125	30	368	50	426	4	702	8	83	1	258	...	13,327	180	576
			225·4	·49	11·1	·98	6·1	1·47	18·6	2·45	20·9	·20	34·5	·39	4·1	·05	12·6	...	654·8	8·84	28·3
	Hills above 5,000 feet sea-level.	8,576	1,438	7	85	7	49	12	103	13	165	3	269	1	35	1	81	...	5,055	72	227
			157·7	·82	9·9	·82	5·7	1·40	12·0	1·52	19·2	·35	31·4	·12	4·1	·12	9·4	...	589·4	8·40	26·5
	Hills below 5,000 feet sea-level.	11,790	3,152	3	141	13	76	18	265	37	261	1	433	7	48	...	171	...	8,322	108	349
			267·3	·25	9·7	1·20	6·4	1·93	18·2	3·14	22·1	·08	36·7	·59	4·1	...	14·5	...	705·9	9·16	29·6
1905.	Plains ...	99,771	14,461	28	669	41	287	33	1,366	185	2,528	23	3,771	18	124	3	1,080	9	55,250	602	2,083
			144·9	·28	6·7	·41	2·9	·33	13·7	1·86	25·3	·21	37·8	·18	1·2	·03	10·8	·09	553·8	6·03	20·9
	Hills ...	20,224	3,444	9	233	17	93	26	277	50	920	5	850	9	84	1	253	...	14,749	365	624
			170·3	·45	11·5	·84	4·6	1·29	13·7	2·39	45·5	·35	42·0	·45	4·2	·05	12·5	...	729·3	18·05	30·9
	Hills above 5,000 feet sea-level.	9,583	1,297	4	60	7	46	13	95	20	333	2	341	6	30	1	100	...	5,698	260	260
			135·3	·42	6·3	·73	4·8	1·36	9·9	2·09	34·7	·21	35·6	·63	5·2	·10	10·4	...	594·6	27·13	27·1
	Hills below 5,000 feet sea-level.	10,641	2,147	5	173	10	47	13	182	30	587	3	509	3	34	...	153	...	9,051	105	364
			201·8	·47	16·3	·94	4·4	1·22	17·1	2·63	55·2	·47	47·8	·28	3·2	...	14·4	...	850·6	9·87	34·2
1906.	Plains ...	101,783	26,348	31	485	33	221	32	856	159	2,108	14	4,656	27	214	10	1,349	3	68,275	665	2,201
			258·9	·30	4·8	·32	2·2	·31	8·4	1·56	20·7	·14	45·7	·27	2·1	·10	13·2	·03	670·8	6·53	21·6
	Hills ...	22,469	6,104	6	146	10	79	29	285	39	734	2	926	8	92	...	347	2	17,957	158	646
			271·7	·27	6·5	·44	3·5	1·29	12·7	1·74	33·6	·09	41·2	·36	4·1	...	15·4	·09	799·1	7·03	28·8
	Hills above 5,000 feet sea-level.	11,510	2,424	2	72	6	34	9	118	17	289	2	437	7	70	...	163	2	6,923	78	293
			214·9	·17	6·3	·52	3·0	·78	10·3	1·48	25·1	·17	38·0	·61	6·1	...	14·2	·17	601·5	6·78	25·5
	Hills below 5,000 feet sea-level.	10,959	3,632	4	74	4	45	20	167	22	465	...	489	1	22	...	184	...	10,134	80	353
			331·2	·36	6·8	·36	4·1	1·82	15·2	2·01	42·4	...	44·6	·09	2·0	...	16·8	...	924·2	7·30	32·2

PRISONERS.

TABLE XIV.—SUMMARY, SICKNESS AND MORTALITY.

A.—Administrations.	Years.	Average strength ‡	RATIO PER MILLE OF STRENGTH.* Admissions.	Constantly sick.	Deaths from: Cholera.	Small-pox.	Remittent fever.	Tubercle of the lungs.	Pneumonia.	Other respiratory diseases.	Dysentery.	Diarrhœa.	Anæmia and debility.	All causes.
Burma	1901-1905	11,779	452	22	·68	·02	·24	3·63	1·32	·51	2·27	·82	·32	16·78
	1905	12,639	380	17	...	·68	·08	3·80	1·03	·63	2·61	·95	·24	17·01
	1906	13,369	280	16	·22	·15	·07	4·19	1·28	·52	1·89	·45	·03	14·81
Eastern Bengal and Assam	1901-1905	6,285	1,099	45	·67	·19	·64	3·34	3·43	·76	7·67	1·05	1·46	28·07
	1905	6,401	1,081	46	1·87	...	·47	3·44	2·56	·94	7·50	·78	2·66	32·96
	1906	6,871	912	43	1·89	...	·15	3·06	3·29	1·16	7·71	·58	·87	29·69
Bengal	1901-1905	14,573	999	37	·77	·04	·29	3·85	2·48	·54	5·83	1·39	·56	23·93
	1905	14,172	954	39	·35	...	·21	4·02	2·18	1·06	6·56	1·06	·49	24·91
	1906	14,857	1,009	38	1·01	·20	·47	4·31	2·96	·74	5·72	·88	·67	23·36
United Provinces of Agra and Oudh	1901-1905	25,557	699	34	·46	·04	·09	2·97	2·54	·94	3·73	1·06	·22	18·77
	1905	23,680	609	27	·17	·04	·21	2·66	3·00	1·40	4·94	·84	·21	17·31
	1906	24,872	603	29	·44	·42	·04	2·85	2·72	·84	1·89	·76	·24	16·56
Punjab	1901-1905	12,333	999	32	...	·40	·34	3·68	4·73	·66	2·61	·75	·68	21·68
	1905	11,512	708	26	·35	·09	·09	4·43	2·52	·69	·52	·17	·69	16·33
	1906	13,744	737	26	...	...	...	3·83	2·64	·17	2·64	1·36	·85	15·75
North-West Frontier Province ...	1901-1905	1,287	1,016	32	...	·78	·16	·93	4·35	·47	3·73	·47	·31	20·35
	1905	1,314	960	34	...	...	·76	1·52	1·52	·76	4·57	·76	...	19·79
	1906	1,300	1,465	36	...	...	...	·77	3·85	1·54	4·62	·77	1·54	25·38
Bombay	1901-1905	8,725	689	29	·05	·16	·80	3·32	6·56	1·06	1·74	1·03	·83	26·36
	1905	7,851	663	27	...	·13	·51	2·29	3·06	1·53	1·15	1·15	·76	17·45
	1906	7,925	3689	27	2·27	...	·88	1·89	3·66	1·14	2·02	·76	·88	20·69
Central Provinces	1901-1905	4,429	772	25	·09	...	·05	2·53	2·48	1·31	3·61	1·85	1·13	20·19
	1905	3,547	630	21	·28	...	...	1·97	1·41	1·13	1·41	·28	·56	15·79
	1906	3,329	598	19	...	...	·60	1·80	1·20	·30	2·10	·30	·60	13·82
Madras	1901-1905	9,832	482	21	1·36	·02	·14	3·59	1·95	·33	2·36	·14	·37	18·74
	1905	10,147	469	19	1·38	...	·20	2·37	1·48	·39	1·06	·30	·20	15·87
	1906	10,428	417	18	4·32	·10	·10	2·49	1·63	·58	4·32	·10	·58	21·77
INDIA†	1901-1905	95,479	759	31	·54	·06	·28	3·32	3·07	·79	3·71	1·04	·56	21·12
	1905	91,917	647	28	·44	·04	·22	3·19	2·28	·92	3·01	·74	·54	19·23
	1906	95,394	658	27	1·20	·09	·21	3·21	2·55	·71	3·25	·73	·55	19·27
ANDAMANS	1901-1905	13,289	1,838	61	...	...	2·59	7·66	4·23	1·28	10·84	1·57	·02	37·38
	1905	14,348	1,898	68	...	...	2·86	6·48	4·81	·91	13·03	·49	...	38·96
	1906	14,688	2,041	70	...	...	2·52	5·58	5·38	1·23	4·90	·34	...	27·30
INDIA¶	1901-1905	1,08,769	891	35	·47	·06	·56	3·85	3·21	·85	4·58	1·11	·49	23·11
	1905	1,06,265	816	33	·38	·04	·37	3·63	2·62	·91	4·37	·71	·47	21·50
	1906	1,10,082	843	33	·95	·08	·52	3·52	2·93	·78	3·47	·68	·47	20·34

* Excluding Subsidiary Jails. † Including Ajmer, Quetta, Mercara and Secunderabad and excluding Andamans. ¶ Including Andamans.

B.—Geographical Groups.	Years.	Average strength ‡	RATIO PER MILLE OF STRENGTH.* Admissions.	Constantly sick.	Admissions from: Influenza.	Cholera.	Small-pox.	Enteric fever.	Intermittent fever.	Remittent fever.	Simple, continued fever.	Pneumonia.	Dysentery.
Group I.—Burma Coast and Bay Islands	1901-1905	2,967	442	21	·7	1·3	·1	·6	97·4	2·8	19·2	3·8	37·0
	1905	8,808	262	14	...	·8	·2	·6	32·1	·8	24·6	3·3	16·3
	1906	9,576	248	15	4·6	·6	1·0	·4	42·0	·6	18·2	3·7	10·7
II.—Burma Inland ...	1901-1905	3,812	471	23	4·2	1·8	·1	·6	107·7	2·5	3·0	8·0	67·7
	1905	3,831	455	22	3·7	·8	...	·8	94·5	·8	6·0	3·4	55·9
	1906	3,793	360	19	...	·3	·3	·3	69·1	·3	6·1	5·5	37·2
III.—Assam	1901-1905	1,739	890	42	19·2	1·5	1·1	·2	258·3	5·6	4·4	4·8	234·2
	1905	1,391	868	32	3·6	1·4	...	...	228·6	4·3	5·8	1·4	259·5
	1906	1,430	757	39	·7	4·9	...	...	280·1	7·0	...	·7	160·1
IV.—Bengal and Orissa ...	1901-1905	12,182	1,014	40	21·2	1·4	·4	·5	270·3	2·1	10·8	10·3	258·9
	1905	11,901	1,036	43	19·8	3·3	·1	1·2	248·0	1·2	2·7	9·0	256·6
	1906	12,457	937	44	9·8	1·6	·6	1·3	213·6	3·0	1·0	9·6	223·8
V.—Gangetic Plain and Chutia Nagpur.	1901-1905	23,686	760	33	16·0	·9	·4	·4	265·3	1·2	4·5	10·0	86·0
	1905	22,083	686	30	12·7	·4	·2	·3	230·0	1·1	3·0	9·1	87·2
	1906	23,376	686	27	3·0	1·1	·7	·3	231·1	·4	11·2	9·6	85·5
VI.—Upper Sub-Himalaya	1901-1905	13,091	946	32	17·8	·1	·3	·6	409·2	1·3	3·0	17·5	56·3
	1905	11,930	669	25	18·7	·3	·3	·6	236·6	1·4	4·8	12·3	33·8
	1906	12,351	818	29	13·5	...	1·0	·3	358·9	·7	2·2	12·4	36·4
VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1901-1905	8,842	785	29	9·5	·3	4·7	·2	291·8	8·3	4·1	27·4	48·5
	1905	8,407	651	26	30·9	·4	1·0	...	212·0	2·1	...	17·4	28·4
	1906	8,447	690	26	5·0	...	·8	·4	277·0	·6	4·0	18·1	37·5
VIII.—South-Western Rajputana, Central India and Gujarat.	1901-1905	4,772	754	30	12·3	·3	·8	·1	278·4	·6	·3	20·5	36·5
	1905	4,346	524	30	...	...	·9	...	160·4	·2	...	22·3	16·1
	1906	4,595	614	32	13·5	...	2·0	·2	191·6	·2	...	18·9	23·7
IX.—Deccan	1901-1905	8,373	812	31	14·0	·1	·3	·2	284·4	6·0	4·5	9·9	50·3
	1905	7,017	672	28	4·6	·1	...	...	158·0	1·0	3·4	6·1	47·2
	1906	6,840	780	29	7·2	1·5	·4	·4	189·2	4·8	1·8	5·8	59·9
X.—Western Coast	1901-1905	2,728	581	25	1·4	·7	1·0	3·7	155·2	4·7	8·3	9·5	40·3
	1905	2,318	532	28	...	...	1·3	3·0	141·1	1·3	11·6	9·9	42·3
	1906	2,452	500	22	...	1·4·7	·8	15·9	109·3	7·7	11·4	12·2	88·9
XI.—Southern India	1901-1905	8,845	497	22	4·4	3·6	·2	·7	106·5	1·2	26·8	9·0	55·1
	1905	9,240	485	20	·6	4·0	·4	2·3	87·7	1·6	34·4	8·4	65·2
	1906	9,429	419	18	1·6	7·3	1·3	2·3	57·6	2·1	30·5	7·4	76·0
XII.—Hills	1901-1905	594	842	28	5·1	1·3	1·0	2·4	266·3	3·7	19·9	20·2	85·5
	1905	575	878	24	...	...	...	...	252·2	3·5	17·4	19·1	80·9
	1906	372	892	31	...	1·2·2	3·5	8·7	239·8	17·5	12·2	32·5	80·6
INDIA†	1901-1905	95,479	759	31	12·7	3·0	1·5	·6	251·9	2·1	8·1	12·4	88·3
	1905	91,917	647	28	11·5	·8	·2	·7	181·7	2·2	9·7	9·7	81·6
	1906	95,394	658	27	5·9	2·0	·9	1·1	207·2	1·5	9·7	10·1	78·9
ANDAMANS	1901-1905	13,289	1,838	61	7·0	...	...	...	1111·2	10·2	...	11·6	156·9
	1905	14,348	1,898	68	13·0	...	...	...	1246·2	6·1	...	11·0	164·4
	1906	14,688	2,041	70	26·2	...	...	1·1	1450·0	4·4	5·4	15·8	94·0
INDIA§	1901-1905	1,08,769	891	35	12·0	·9	·4	·5	356·9	3·1	7·1	12·3	96·7
	1905	1,06,265	816	33	11·7	·7	·3	·6	325·5	1·9	8·4	9·9	92·7
	1906	1,10,082	843	33	8·6	1·7	·7	·9	323·0	1·9	9·2	10·9	89·9

* Excluding Subsidiary Jails. † Including Aden and excluding Andamans. § Including Andamans. ‡ The quinquennial ratios are, of course, worked on the total strength of the five years.

PRISONERS.

TABLE XV.—RATIOS OF ADMINISTRATIONS.

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.											
	Burma.	Eastern Bengal and Assam.	Bengal.	United Provinces.	Punjab.	N.-W. F. Province.	Bombay.	Central Provinces.	Madras.	India.*	Andamans.	India.†
I.—AVERAGE ANNUAL STRENGTH	13,369	6,871	14,857	24,872	11,744	1,380	7,925	3,379	10,428	95,394	14,688	110,082
II.—CONSTANTLY SICK-RATE OF EACH MONTH—												
January	14·6	53·5	34·3	24·0	21·5	29·9	24·4	17·1	17·1	25·0	58·8	29·6
February	15·5	43·8	33·8	22·3	19·8	23·9	25·2	15·8	15·8	23·6	62·5	28·9
March	16·6	47·6	35·9	22·7	20·5	19·6	27·3	16·4	14·4	23·8	62·3	29·0
April	14·5	40·3	32·4	24·0	24·1	25·1	27·7	18·3	11·1	25·1	62·3	30·4
May	14·7	36·4	27·6	25·1	25·7	35·0	27·4	15·0	16·5	25·5	66·2	31·0
June	15·8	36·5	34·8	25·1	25·0	42·7	29·3	17·8	16·3	25·5	73·6	31·9
July	18·3	38·6	38·2	26·0	25·2	38·5	32·0	22·0	17·6	27·2	82·2	34·5
August	17·5	40·6	43·5	29·7	25·1	34·6	34·5	27·5	21·4	29·9	85·4	37·2
September	14·6	40·7	42·3	31·8	29·3	30·3	31·4	23·1	28·0	30·7	78·0	36·9
October	15·9	52·9	40·0	30·6	30·8	47·9	33·7	19·5	22·4	30·8	76·5	36·8
November	15·8	49·3	38·9	31·4	32·2	66·5	33·2	27·6	18·2	30·5	67·2	35·4
December	14·6	48·3	38·3	26·9	32·1	39·2	35·3	17·1	18·6	29·0	68·8	34·3
OF THE YEAR	15·7	43·3	38·0	26·6	26·0	35·5	30·7	18·9	18·4	27·2	70·5	33·0
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	40·1	36·4	...	26·1	33·3	28·0	18·4	18·6	26·6	...	32·2
III.—ADMISSION-RATE OF THE YEAR—												
Influenza	3·3	14·4	2·8	11·1	·4	29·2	·5	24·4	·9	5·9	26·2	8·6
Cholera	·5	2·0	1·4	·7	...	...	3·7	·3	7·9	2·0	...	1·7
Small-pox	·8	·1	1·0	1·0	·6	·8	·6	·9	1·2	·9	...	·7
Enteric Fever	·4	2·9	·2	·3	·3	...	·3	·3	5·8	1·1	...	·9
Intermittent Fever	49·7	234·8	320·7	225·0	291·8	809·2	139·3	196·8	60·2	207·2	1,450·0	373·0
Remittent Fever	·5	2·5	2·7	·9	·2	...	2·9	2·7	2·1	1·5	4·4	1·9
Simple Continued Fever	1·7	...	6·8	9·0	3·7	26·2	2·5	2·4	28·9	9·7	5·4	9·2
Tubercle of the lungs	8·5	9·3	15·1	7·6	7·3	7·7	5·0	3·9	9·7	8·8	6·9	8·6
Pneumonia	4·2	9·0	10·0	12·1	11·1	23·8	15·4	6·3	7·4	10·1	15·8	10·9
Other Respiratory Diseases	12·3	39·0	30·3	23·7	27·5	35·4	32·9	13·2	21·8	25·2	53·0	28·9
Dysentery	18·2	242·2	189·6	37·1	33·8	70·5	54·8	42·7	78·0	78·9	94·0	80·8
Diarrhœa	9·9	73·5	84·9	21·5	30·1	31·5	60·2	33·9	3·3	39·1	36·5	38·8
Spleen Diseases	...	...	·4	·5	·2	1·5	2·1	·3	...	·4	...	·4
Scurvy	·1	·0	·7	·0	·3	3·1	3·5	·1	·4	·6	·3	·7
Anæmia and Debility	2·5	39·3	10·4	10·9	22·1	25·4	14·5	14·1	5·0	14·5	...	10·8
Abscess, Ulcer and Boil	38·4	41·0	69·1	79·6	108·9	176·9	89·0	70·9	22·8	68·9	98·6	72·8
ALL CAUSES	279·5	911·8	1,008·8	603·0	730·6	1,461·6	689·3	598·4	466·5	694·3	2,240·8	842·2
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	876·2	990·7	...	737·0	1,504·1	672·2	594·6	511·9	665·1	...	830·9
IV.—DEATH-RATE OF THE YEAR—												
Cholera	·22	1·89	1·01	·44	...	...	2·27	...	4·32	1·10	...	·95
Small-pox	·15	...	·20	·12	...	...	...	...	·10	·09	...	·08
Enteric Fever	·15	·73	·13	·04	·09	...	...	...	·67	·19	...	·16
Intermittent Fever	·45	2·77	·81	·83	·34	1·54	·50	·20	·19	·25	·95	·28
Remittent Fever	·07	·15	·47	·04	...	...	·88	·60	·10	·21	2·52	·52
Simple Continued Fever	...	...	...	...	...	...	...	...	...	...	...	...
Tubercle of the lungs	4·19	3·06	4·31	2·85	3·83	·77	1·89	1·80	2·49	3·21	5·58	3·52
Pneumonia	1·20	3·20	2·96	2·77	2·64	3·85	3·66	1·20	4·63	2·55	5·38	2·93
Other Respiratory Diseases	·52	1·16	·74	·84	·17	1·54	1·14	·30	·58	·71	1·23	·78
Dysentery	1·50	7·71	5·72	1·89	2·64	4·62	2·02	2·10	4·32	3·25	4·90	3·47
Diarrhœa	·45	·58	·88	·76	1·36	·77	·76	·30	·10	·73	·34	·68
Hepatic Abscess	·15	...	...	...	...	...	·25	...	...	·04	·07	·05
Anæmia and Debility	·07	·87	·67	·24	·85	1·54	·88	·60	·58	·55	...	·47
Phagedæna, Slough, and Gangrene	...	...	...	·08	·09	...	...	...	...	·03	...	·03
ALL CAUSES	14·81	29·69	23·36	16·56	15·75	25·38	20·69	13·82	21·77	19·27	27·30	20·34
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	27·95	23·71	...	15·85	24·79	21·10	13·66	20·81	19·37	...	20·37
V.—PERCENTAGE IN 100 ADMISSIONS—												
Influenza	1·18	1·58	·27	1·83	·06	2·00	·07	2·41	·21	·90	1·28	1·02
Cholera	·19	·22	·14	·11	...	...	·82	·05	1·89	·30	...	·20
Small-pox	·29	·02	·10	·17	·08	·05	·09	·15	·30	·13	...	·09
Enteric Fever	·13	·32	·02	·05	·03	...	·04	·05	1·40	·16	...	·11
Intermittent Fever	17·77	25·75	32·78	37·32	39·61	55·25	20·21	38·50	14·46	31·48	71·05	44·86
Remittent Fever	·19	·27	·29	·11	·02	...	·42	·45	·51	·22	·22	·22
Simple Continued Fever	5·27	...	·67	1·50	·51	1·79	·37	·49	6·93	1·48	·27	1·09
Tubercle of the lungs	3·05	1·04	1·50	1·25	·99	·53	·73	·05	2·33	1·34	·34	1·02
Pneumonia	1·50	·99	·99	2·01	1·50	1·63	2·33	1·05	1·72	1·53	·77	1·29
Other Respiratory Diseases	4·39	4·28	3·00	3·93	3·73	2·42	4·78	2·21	5·71	3·82	2·60	3·45
Dysentery	6·50	26·56	18·59	6·15	4·59	5·36	7·94	7·13	18·72	11·98	4·61	9·60
Diarrhœa	3·56	8·06	8·41	3·57	6·80	3·52	8·73	5·68	·78	5·85	1·29	4·60
Spleen Diseases	...	...	·04	·09	·02	·11	·34	·05	...	·07	...	·04
Scurvy	·03	·11	·07	·01	·03	·21	·51	...	·09	·09	·04	·08
Anæmia and Debility	·91	4·31	1·03	1·63	2·09	1·73	1·07	2·36	1·20	1·90	...	1·29
Abscess, Ulcer, and Boil	13·76	4·50	6·85	13·20	14·78	12·08	12·90	21·86	5·48	10·48	4·83	9·63
VI.—PERCENTAGE IN 100 DEATHS—												
Cholera	1·5	6·4	4·3	2·7	...	...	11·0	...	19·3	5·7	...	4·7
Small-pox	1·0	...	·9	·7	...	...	...	...	·4	·5	...	·4
Enteric Fever	1·0	2·5	·6	·2	·5	...	...	...	3·1	1·0	...	·8
Intermittent Fever	3·0	9·3	3·5	5·3	2·2	6·1	2·4	2·2	·9	3·9	3·5	3·8
Remittent Fever	·5	·5	2·0	·2	...	...	4·3	4·3	·4	1·1	2·2	2·5
Simple Continued Fever	...	...	...	...	...	...	...	...	...	...	...	...
Tubercle of the lungs	28·3	10·3	18·4	17·2	24·3	3·0	9·1	13·0	11·5	16·7	20·4	17·3
Pneumonia	8·1	10·8	12·7	16·7	16·8	13·2	17·7	6·7	7·5	13·2	19·7	14·4
Other Respiratory Diseases	3·5	3·9	3·2	5·1	1·1	6·1	5·5	2·2	2·6	3·7	4·5	3·8
Dysentery	10·1	26·0	24·5	11·4	16·8	13·2	9·8	15·2	19·8	16·9	18·0	17·1
Diarrhœa	3·0	2·0	3·7	4·6	8·6	3·0	3·7	2·2	·4	3·8	1·2	3·3
Hepatic Abscess	·10	...	...	...	...	...	1·2	...	...	·2	·2	·2
Anæmia and Debility	·5	2·9	2·9	1·5	5·4	6·1	4·3	4·3	2·6	2·8	...	2·3
Phagedæna, Slough, and Gangrene	...	...	...	·5	·5	...	...	...	...	·2	...	·1

* Including Ajmer, Secunderabad, Quetta, Mercara and excluding Andamans.

† Including Ajmer, Secunderabad, Quetta, Mercara and Andamans.

TABLE XVI.—RATIOS OF GEOGRAPHICAL GROUPS.

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
	Burma Coast and Bay Islands.	Burma Inland.	Assam.	Bengal and Orissa.	Gangetic Plain and Chutia Nagpur.	Upper Sub-Himalaya.	N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	S.-E. Rajputana, Central India, and Gujarat.	Deccan.	Western Coast.	Southern India.	Hills.	India.*
I.—AVERAGE ANNUAL STRENGTH	9,576	3,793	1,430	12,457	23,376	12,358	8,447	4,595	6,840	2,452	9,429	572	95,394
II.—CONSTANTLY SICK-RATE OF EACH MONTH—													
January	13·6	17·0	45·2	47·4	23·8	23·5	23·5	27·1	23·1	18·8	17·3	24·0	25·0
February	13·6	20·4	40·8	44·3	21·9	20·2	22·0	26·8	23·6	18·5	16·0	24·6	23·6
March	12·4	27·0	40·0	41·2	23·2	21·0	21·7	23·3	25·1	17·1	14·6	28·5	23·8
April	11·7	21·3	37·4	42·3	26·6	24·7	23·9	25·4	27·4	17·7	13·9	30·4	25·1
May	12·1	21·2	37·1	40·9	26·5	25·2	26·4	26·1	26·7	20·2	15·5	35·4	25·5
June	15·2	17·1	39·9	37·7	25·6	24·7	25·8	31·1	29·2	23·3	15·6	37·5	25·5
July	16·9	22·1	43·7	39·8	27·7	24·6	27·4	29·5	32·8	26·6	17·1	38·0	27·2
August	16·6	20·0	42·5	45·3	30·1	28·6	24·2	30·5	37·3	25·9	21·5	39·9	29·9
September	14·7	14·4	30·5	45·6	29·5	27·7	23·5	32·4	33·4	29·0	26·9	28·4	30·7
October	16·3	14·7	44·9	40·4	28·3	28·7	28·8	38·0	30·4	18·9	22·7	31·9	30·8
November	15·7	15·9	34·2	48·4	28·1	41·1	31·5	36·6	29·4	20·3	19·2	29·0	30·5
December	15·2	13·1	27·2	47·1	26·0	36·1	31·7	33·9	31·3	21·3	19·8	27·5	29·0
OF THE YEAR	14·6	18·6	39·3	44·1	26·5	28·8	26·0	31·6	29·1	21·6	18·4	30·8	27·2
III.—ADMISSION-RATE OF THE YEAR—													
Influenza	4·6	...	·7	9·8	3·9	13·5	5·0	13·5	7·2	...	1·0	...	5·9
Cholera	·6	·3	4·9	1·6	1·1	...	...	...	1·5	14·7	7·3	22·7	2·0
Small-pox	1·0	·3	...	·6	·7	1·0	·8	2·0	·4	·8	1·3	3·5	·9
Enteric Fever	·4	·3	...	1·3	·3	·3	·1	·2	·4	15·9	2·3	8·7	1·1
Intermittent Fever	42·0	69·4	460·1	273·6	231·1	358·9	277·0	194·6	189·2	109·3	57·6	237·8	207·2
Remittent Fever	·6	·3	7·0	3·0	·4	·7	·6	·2	1·8	7·7	2·1	17·5	1·5
Simple Continued Fever	18·2	6·1	...	1·0	11·8	7·2	4·0	...	1·8	11·4	30·5	12·2	9·7
Tubercle of the lungs	9·2	6·9	4·2	16·4	7·8	18·0	7·6	4·8	3·5	3·3	10·2	5·2	8·8
Pneumonia	3·7	5·5	7·7	9·6	9·6	12·4	18·1	18·9	5·8	12·2	7·4	31·5	10·1
Other Respiratory Diseases	10·2	17·1	22·4	33·6	24·5	30·4	31·8	23·1	19·7	34·3	23·4	33·6	25·2
Dysentery	10·7	37·2	160·1	221·8	85·5	36·4	37·5	25·7	59·9	88·9	76·0	86·4	78·9
Diarrhœa	3·8	25·6	51·7	84·1	38·9	43·6	39·5	24·8	70·2	24·1	2·3	61·2	39·1
Spleen Diseases	...	...	...	·3	·1	·3	2·0	2·0	·7	...	...	...	·4
Scurvy	...	...	1·4	...	·3	·2	3·0	·2	5·0	·4	·4	...	·6
Anæmia and Debility	1·5	5·3	30·1	23·4	9·6	20·2	16·3	12·2	13·2	7·3	5·4	15·7	12·5
Abscess, Ulcer, and Boil	33·7	50·4	53·8	54·2	39·1	100·1	88·3	81·2	114·0	23·2	23·4	87·4	68·9
ALL CAUSES	247·6	359·9	757·3	936·5	680·0	818·2	689·9	613·7	770·7	499·6	418·7	891·6	658·3
IV.—DEATH-RATE OF THE YEAR—													
Cholera	·38	...	4·90	1·28	·68	...	...	...	·44	6·92	3·61	19·23	1·10
Small-pox	·21	...	...	·08	·07	·08	...	...	...	...	·11	...	·09
Enteric Fever	·10	·26	...	·32	·03	·03	...	·22	...	1·22	·42	3·50	·19
Intermittent Fever	·10	1·32	4·20	1·43	·08	·82	·36	·65	·58	·82	...	...	·75
Remittent Fever	·10	...	...	·49	·09	·08	·47	...	·44	1·63	...	...	·21
Simple Continued Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Tubercle of the lungs	4·59	3·16	1·40	4·90	3·87	4·40	3·43	2·39	1·17	1·63	2·55	3·50	3·21
Pneumonia	1·46	·53	2·10	3·21	2·05	3·56	4·38	4·35	·73	3·26	1·48	13·99	2·55
Other Respiratory Diseases	·52	·53	·70	·88	·08	·32	·59	·87	·58	1·63	·53		·71
Dysentery	·73	3·43	16·03	5·94	2·99	2·51	2·13	1·52	1·75	1·49	4·14	8·74	3·25
Diarrhœa	·21	1·05	·70	·72	·50	1·38	·47	...	·73	1·22	·11	5·24	·73
Hepatic Abscess	·21	...	...	...	...	...	...	...	·29	...	...	...	·04
Anæmia and Debility	·10	...	3·50	·48	·43	·32	1·42	·22	·58	·41	·64	3·50	·55
Phagedæna, Slough, and Gangrene	...	...	...	...	·09	...	·12	...	...	...	...	...	·03
ALL CAUSES	13·17	18·19	39·16	26·09	17·71	16·19	20·84	15·50	13·16	25·29	20·68	64·69	19·27
V.—PERCENTAGE IN 100 ADMISSIONS—													
Influenza	1·86	...	·09	·99	·43	1·65	·72	2·20	·92	...	·23	...	·90
Cholera	·25	·07	·65	·16	·16	...	...	...	·19	2·94	1·75	2·55	·30
Small-pox	·42	·07	...	·06	·11	·12	·12	·32	·06	·16	·30	·39	·13
Enteric Fever	·17	·07	...	·13	·04	·04	·02	·04	·06	3·18	·56	·98	·16
Intermittent Fever	16·95	19·19	34·35	27·73	33·99	43·87	40·15	31·70	24·26	21·88	13·75	26·67	31·48
Remittent Fever	·25	·07	·92	·30	·06	·09	·09	·04	·23	1·55	·51	1·06	·22
Simple Continued Fever	7·34	1·68	...	·71	1·64	·88	·58	...	·23	2·29	7·29	1·37	1·48
Tubercle of the lungs	3·71	1·90	·55	1·62	1·16	1·23	1·10	·78	·45	·65	2·43	·59	1·34
Pneumonia	1·48	1·54	1·02	·98	1·42	1·51	2·63	3·09	·75	2·45	1·77	3·53	1·53
Other Respiratory Diseases	4·13	4·84	2·95	3·43	3·60	3·72	4·62	3·76	2·53	6·86	5·60	3·73	3·82
Dysentery	4·30	10·33	21·14	22·69	12·57	4·44	5·44	3·87	7·69	17·80	18·16	9·02	11·98
Diarrhœa	1·52	7·11	6·83	8·53	5·73	5·32	5·73	3·55	9·00	4·82	·56	6·86	5·95
Spleen Diseases	...	...	...	·03	·01	·04	·29	·32	·09	...	...	...	·07
Scurvy	...	·07	·18	·07	·05	·02	·43	·04	·13	·08	·10	...	·09
Anæmia and Debility	·59	1·47	3·97	2·38	1·33	1·47	2·37	1·99	1·69	1·47	1·29	1·76	1·90
Abscess, Ulcer, and Boil	13·62	13·99	7·11	5·49	11·04	12·23	12·80	13·23	14·23	4·65	5·60	9·80	10·45
VI.—PERCENTAGE IN 100 DEATHS—													
Cholera	2·3	...	12·5	4·9	3·9	...	...	...	3·3	24·2	17·4	29·7	5·7
Small-pox	1·6	...	...	·6	1·3	·6	...	...	...	...	·5	...	·5
Enteric Fever	·8	1·4	...	1·2	·4	·3	...	1·2	...	4·3	2·3	5·4	1·0
Intermittent Fever	·8	7·2	10·7	5·5	5·6	3·5	4·7	3·5	4·4	3·2	...	...	3·9
Remittent Fever	·8	...	...	1·5	·5	2·3	...	...	3·3	1·5	...	...	1·1
Simple Continued Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Tubercle of the lungs	34·2	17·4	3·6	18·6	16·4	21·8	16·3	13·9	8·9	6·5	12·3	5·4	16·7
Pneumonia	10·9	2·9	3·4	12·5	11·5	22·0	21·9	23·5	5·6	12·9	7·2	21·6	13·2
Other Respiratory Diseases	2·9	2·9	1·8	3·4	5·6	3·0	2·8	5·2	4·4	6·5	2·6	...	3·7
Dysentery	5·4	13·8	44·2	22·8	18·9	13·5	10·3	8·2	13·3	17·7	20·0	43·5	16·9
Diarrhœa	1·6	5·8	1·8	2·8	5·1	3·5	2·3	...	5·6	4·8	·5	8·1	3·8
Hepatic Abscess	1·6	...	...	...	...	...	...	...	2·2	...	...	...	·3
Anæmia and Debility	·8	...	8·9	1·8	2·4	2·0	6·8	1·2	4·4	1·6	3·1	5·4	2·8
Phagedæna, Slough, and Gangrene	...	...	...	...	·5	...	·6	...	...	...	...	...	·2

* Including Aden and excluding Andamans.

General Population.

Table XVII.—Provincial Birth and Death Statistics.

Province.	Year.	Births. Total number.	Births. Ratio per 1,000 of population.	Births. Mean ratio per 1,000 of population during previous five years.	Number of deaths. In municipalities and towns.	Number of deaths. In districts excluding towns.	Number of deaths. Total.	Ratio of deaths per 1,000 of population. In municipalities and towns.	Ratio of deaths per 1,000 of population. In districts excluding towns.	Ratio of deaths per 1,000 of population. Total.	Highest death-rate. In municipalities and towns.	Highest death-rate. In districts excluding towns.	Lowest death-rate. In municipalities and towns.	Lowest death-rate. In districts excluding towns.	Mean death-rate during previous five years. In municipalities and towns.	Mean death-rate during previous five years. In districts excluding towns.	Mean death-rate during previous five years. Total.	Number of deaths of males to every 100 deaths of females.
Bengal ...	1905	1,973,301	39·55	38·91	128,412	1,793,957	1,922,369	40·21	38·42	38·53	92·26	59·63	27·41	22·07	38·62	33·06	33·42	106
	1906	1,685,725	37·32	39·50	133,152	1,710,091	1,823,243	35·08	36·15	35·98	74·13	48·41	5·99	23·56	38·68	33·88	34·15	108
Eastern Bengal and Assam.	1905	1,173,879	39·37	39·53	16,798	1,038,507	1,045,305	26·42	35·25	35·06	53·21	46·61	4·77	19·90	26·66	31·64	31·52	108
	1906	1,114,548	37·38	39·63	15,353	928,982	944,335	24·15	31·83	31·67	85·79	49·19	5·73	22·28	25·33	31·80	31·66	110
United Provinces of Agra and Oudh.	1905	1,967,009	41·24	44·07	180,482	1,917,838	2,098,300	53·64	43·26	44·00	105·71	91·24	23·69	25·38	47·13	32·78	33·80	100·11
	1906	1,918,425	40·22	44·23	165,052	1,698,284	1,863,336	49·13	38·31	39·07	111·95	81·01	24·78	24·25	49·14	35·37	36·35	104·76
Punjab	1905	893,260	44·4	40·5	99,151	856,957	956,108	49·13	47·37	47·55	306·36	89·10	7·10	21·31	47·63	44·58	44·88	99·1
	1906	878,006	43·7	41·6	90,184	652,724	742,908	44·73	36·08	36·94	89·23	49·87	9·16	20·05	46·68	45·01	45·17	101·9
North-West Frontier Province.	1905	70,369	35·4	33·3	5,062	48,265	53,327	30·82	26·42	26·79	44·25	28·12	16·77	25·75	28·01	25·22	25·5	110·4
	1906	76,834	38·6	33·2	6,118	61,031	67,149	36·28	33·50	33·73	52·21	45·77	16·29	21·41	28·63	25·30	25·57	101·6
Central Provinces and Berar.	1905	642,199	54·02	41·78	50,637	391,756	442,383	41·87	36·69	37·21	122·05	52·17	12·67	28·43	47·40	35·52	36·73	109·85
	1906	614,616	51·72	45·83	61,307	455,106	516,613	50·01	42·71	43·47	220·59	65·01	19·04	30·05	41·71	30·08	31·33	107·89
Madras Presidency.	1905	1,176,256	32·0	29·4	125,944	660,179	786,123	29·6	20·3	21·4	92·2	30·6	5·6	15·4	29·8	21·1	21·9	104·3
	1906	1,125,078	30·9	29·4	142,109	856,282	998,391	33·4	26·6	27·4	77·5	33·9	6·1	20·9	29·2	20·6	21·5	103·5
Coorg ...	1905	4,552	25·31	23·98	490	4,249	4,739	32·13	35·70	35·24	45·99	31·52	18·74	21·70	46·12	29·5	34·20	118·20
	1906	4,713	26·10	23·31	558	4,727	5,285	36·59	28·59	29·26	49·73	34·06	21·20	23·69	41·97	28·42	29·57	119·39
Bombay Presidency.	1905	611,173	35·05	30·51	185,007	473,387	588,394	47·59	29·47	31·84	65·24	46·93	8·38	14·22	69·10	43·25	46·31	108 36
	1906	625,486	33·84	31·75	129,893	518,126	648,019	53·76	32·25	35·06	103·56	42·74	8·75	19·88	56·15	36·03	38·66	109·36
Lower Burma	1905	191,216	34·34	33·46	27,064	111,289	138,856	38·21	23·00	24·93	54·53	27·64	16·53	14·26	30·94	22·08	22·17	129
	1906	180,025	32·33	32·60	30,247	120,946	151,193	43·59	24·89	27·15	65·04	40·76	19·22	15·37	32·14	21·53	22·83	127
Upper Burma	1905	10,351*	34·03*	37·03*	10,823	54,698	65,541	36·86	20·87	22·46	62·35	30·36	24·08	15·47	33·25	17·95	19·63	99
	1906	10,355†	34·17†	36·64†	15,279	61,214	76,493	50·42	23·41	26·22	89·12	35·44	22·35	17·27	34·00	18·20	19·84	100
Ajmer-Merwara.	1905	17,802	37·32	26·38	6,608	9,729	16,337	50·94	28·01	34·25	105·20	41·10	26·40	18·28	61·74	48·01	51·75	107·48
	1906	15,789	33·91	30·51	5,731	9,636	15,367	44·21	27·75	33·22	70·94	45·24	31·65	0·50	41·76	27·41	31·31	105·14

* Statistics for 12 towns.
† Statistics for 13 towns.

Table XVIII.—Births.

Province.	Population under registration.	Ratio of Births per 1,000 of population. Maximum for any one district.	Ratio of Births per 1,000 of population. Minimum for any one district.	Ratio of Births per 1,000 of population. Mean for the province.	Number of males born to every 100 females born.	Excess of births over deaths per 1,000 of population.	Excess of deaths over births per 1,000 of population.
Bengal	30,528,044	55·66	17·79	37·32	105	1·24	...
Eastern Bengal and Assam ...	29,812,735	45·94	32·55	37·38	107	5·71	...
United Provinces of Agra and Oudh	47,691,782*	54·42	27·74	40·22	108·72	1·15	...
Punjab	20,108,690	67·3	20·0	43·7	109·7	6·8	...
North-West Frontier Province ...	1,900,744	46·1	36·2	38·6	118·8	4·90	...
Central Provinces and Berar ...	12,884,340	62·78	44·91	51·72	104·52	8·25	...
Madras Presidency	36,484,486	37·6	20·4	30·9	104·4	3·50	...
Coorg	180,607	39·97	20·37	26·10	97·28	...	3·17
Bombay Presidency	18,482,362	52·47	16·63	33·84	107·60	...	1·22
Burma ... { Lower ...	5,568,479	43·45	17·16	32·33	107	5·00	...
Burma ... { Upper ...	303,014	39·22	28·58	34·17	108	...	16
Ajmer-Merwara	476,912	33·65	27·50	28·91	113·65	...	3·31

* Includes 26,010 persons enumerated at the Ajodhya Fair.
† Statistics for 13 towns.

GENERAL POPULATION.

TABLE XIX—DEATHS.

PROVINCE.	Population under registration.	Area in square miles.	Average population per square mile.	RATIO OF DEATHS PER 1,000 OF POPULATION.			DEATH RATE BY SEX.	
				Maximum for any one district.	Minimum for any one district.	Mean for the year.	Male.	Female.
Bengal	50,528,044	110,442	457	47·51	23·55	36·08	37·91	34·28
Eastern Bengal and Assam ...	29,812,735	71,555	416	48·88	23·22	31·67	32·59	30·71
United Provinces of Agra and Oudh.	47,691,782*	107,164	445	80·75	26·63	39·07	38·72	39·44
Punjab	20,108,690	97,209	207	49·7	24·2	36·9	34·7	39·5
North-West Frontier Province. ...	1,990,744	13,688	149	44·2	31·9	33·7	31·7	36·0
Central Provinces and Berar ...	11,884,340	97,841	121	64·38	30·00	43·47	55·58	41·41
Madras Presidency ...	36,484,486	129,241	282	46·9	22·0	27·4	28·2	26·5
Coorg	180,607	1,583	114	33·36	23·69	29·26	28·68	29·99
Bombay Presidency ...	18,481,362	122,984	150	68·98	21·39	35·06	35·26	34·85
Burma ... Lower ...	5,568,479	76,932	72	47·57	17·43	27·15	28·63	25·45
Burma ... Upper ...	2,917,501	29,411	99	43·59	18·35	26·22	27·68	24·91
Ajmer-Merwara ...	476,912	2,711	176	33·74	27·11	32·22	31·38	33·16

* Includes 16,010 persons enumerated at the Ajodhya Fair.

TABLE XX.—DEATHS IN TOWNS AND RURAL CIRCLES COMPARED.

Province.	NUMBER OF REGISTRATION CIRCLES.			POPULATION.			RATIO OF DEATHS PER 1,000 OF POPULATION.		
	Rural.	Town.	Total.	Rural.	Town.	Total.	Rural.	Town.	Total.
Bengal	400	129	529	47,298,478	3,229,566	50,528,044	36·15	35·03	36·08
Eastern Bengal and Assam....	242	54	296	29,177,017	635,718	29,812,735	31·83	24·15	31·67
United Provinces of Agra and Oudh.	857	447	1,304	44,333,434	3,358,348	47,691,782*	38·31	49·15	39·07
Punjab	405	144	549	18,092,723	2,015,967	20,108,690	36.08	44·73	36·94
North-West Frontier Province.	64	11	75	1,822,091	168,653	1,990,744	33·50	36·28	33·73
Central Provinces and Berar...	245	104	349	10,654,609	1,229,731	11,884,340	42·71	50·01	43·47
Madras Presidency ...	185	232	417	32,234,437	4,250,049	36,484,486	26·6	33·4	27·4
Coorg	5	5	10	165,358	15,249	180,607	28·59	36·59	29·26
Bombay Presidency ...	224	56	280	16,065,004	2,416,358	18,481,362	32·25	53·76	35·06
Burma {Lower ...	252	39	291	4,858,273	710,206	5,568,479	24·89	42·59	27·15
Burma {Upper ...	132	13	145	2,614,487	303,014	2,917,501	23·41	50·42	26·22
Ajmer Merwara ...	17	6	23	347,280	129,632	476,912	27·75	44·21	32·22

* Includes 16,010 persons enumerated at the Ajodhya Fair.

TABLE XXI.—DEATHS ACCORDING TO AGE.

Province.	RATIO PER 1,000 OF POPULATION.																	
	Under one year.		1-5 years.		5-10 years.		10-15 years.		15-20 years.		20-30 years.		30-40 years.		40-50 years.		50-60 years.		60 years and upwards.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Bengal* ...	298·29	256·77	58·12	51·25	21·62	18·38	15·79	13·86	18·41	17·59	21·77	20·44	25·04	21·78	30·96	24·88	46·45	41·62	92·11	74·89
Eastern Bengal and Assam.	246·18	206·85	45·68	38·76	17·16	13·34	12·23	11·40	17·34	21·38	18·69	22·65	21·82	23·12	27·06	24·48	41·03	36·86	77·19	62·19
United Provinces of Agra and Oudh.	333·57	320·45	78·16	78·40	19·51	18·10	12·04	12·47	14·57	18·76	18·13	20·46	20·71	20·91	28·08	25·84	45·38	41·47	83·44	70·98
Punjab ...	310·30	318·62	70·23	76·94	14·44	17·20	11·72	16·87	13·16	17·38	14·07	18·32	16·26	19·44	22·16	22·83	31·58	32·19	74·89	80·05
North-West Frontier Province.	251·21	216·20	67·02	72·82	15·95	18·54	8·81	12·12	7·38	11·82	9·51	15·29	13·06	19·08	20·21	23·94	33·34	36·08	69·77	75·79
Central Provinces and Berar.	Not available																			
Madras Presidency	211·1	177·1	38·8	36·7	13·0	12·3	9·3	9·0	12·8	16·4	14·5	14·8	15·5	14·1	21·6	17·0	34·4	28·8	82·7	77·6
Coorg ...	207·82	197·30	46·41	40·70	9·34	10·09	8·67	7·80	11·50	12·40	17·31	22·03	24·32	27·20	39·71	35·88	51·61	43·37	86·53	71·67
Bombay Presidency.	352·91	319·39	63·53	62·10	15·44	15·54	11·95	13·26	17·73	19·97	19·72	21·37	22·54	21·51	29·16	23·14	44·63	36·14	94·50	85·98
Burma {Lower ...	342·05	247·02	34·25	30·62	16·75	15·06	11·13	10·05	15·37	12·57	16·00	13·83	18·49	17·71	22·32	19·87	28·93	23·98	65·49	63·32
Burma {Upper ...	273·36	192·79	28·84	26·57	12·26	11·48	9·19	8·30	13·18	10·68	13·44	13·52	16·21	16·67	19·84	16·09	29·38	22·98	71·93	66·89
Ajmer-Merwara ...	713·32	726·50	135·82	145·70	10·13	10·00	5·26	7·20	7·51	12·91	11·01	14·73	14·57	15·39	21·20	16·68	37·56	33·88	86·24	65·90

* Excluding Sambalpur district for which the population figures are not available.

General Population.

Table XXII.—Deaths according to Cause.

Province.	Deaths per 1,000 of population in 1906.									Ratio of deaths in 1905.	Ratio of deaths in 1904.
	Cholera.	Small-pox.	Plague.	Fevers.	Dysentery and Diarrhœa.	Respiratory diseases.	Injuries.	All other causes.	All causes.		
Bengal	3·81	·43	1·17	22·41	·96	·25	·52	6·48	36·08	38·53	31·55
Eastern Bengal and Assam ...	3·63	·23	·002	21·65	·90	·07	·39	4·77	31·67	35·06	25·85*
United Provinces of Agra and Oudh	3·14	·28	1·46	27·62	·55	·42	·54	5·05	39·07	44·00	34·79
Punjab	0·24	0·66	4·56	20·28	0·87	2·84	0·33	7·18	36·94	47·55	49·06
North-West Frontier Province ...	...	0·37	0·02	26·14	0·29	0·69	0·37	5·65	33·73	26·79	28·56
Central Provinces and Berar ...	3·26	·83	1·53	18·95	3·58	1·40	·53	13·39	43·47	37·21	32·06
Madras Presidency	3·9	0·8	0·02	8·4	1·7	0·7	0·3	11·6	27·4	21·4	22·50
Coorg	·06	1·30	...	23·62	·78	·24	·13	4·14	29·26	26·24	26·62
Bombay Presidency	2·50	·22	2·79	14·86	3·34	3·28	·37	7·71	35·06	31·84	41·39
Burma ... { Lower	·99	1·42	·94	9·77	1·65	·72	·30	11·36	27·15	24·93	22·36
Burma ... { Upper	·80	·22	1·17	7·34	·68	·87	·44	14·69	26·22	22·46	18·69
Ajmer-Merwara	·60	·57	·14	25·77	1·18	·67	·34	2·95	32·22	34·25	27·57

* Excluding statistics for Eastern Bengal.

Table XXIII.—Total number of Deaths by Months.

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population.	
														1906.	1905.
Bengal ...	167,506	127,983	152,439	172,096	151,196	120,160	138,805	137,708	143,037	175,430	166,190	170,613	1,823,243	36·08	38·53
Eastern Bengal and Assam.	115,352	71,973	70,820	81,140	77,778	60,309	65,113	50,560	60,196	84,240	90,035	117,720	944,335	31·67	35·06
U. P. of Agra and Oudh.	131,895	111,559	130,535	148,729	175,852	159,271	115,274	134,525	180,391	207,531	201,365	176,409	1,863,336	39·07	44·00
Punjab ...	53,767	41,845	47,698	61,162	87,576	51,094	42,415	43,191	51,502	76,548	93,501	84,527	743,906	36·94	47·55
N. W. F. Province	4,992	3,968	4,432	3,756	4,352	4,905	3,941	3,788	5,187	6,189	10,384	11,353	67,149	33·73	36·29
C. P. and Berar...	32,895	33,340	33,035	36,833	44,506	43,322	32,569	6,144	65,724	90,170	46,185	39,877	516,613	43·47	37·21
Madras Presidency.	68,582	55,762	58,289	6,226	66,261	77,626	107,120	126,348	108,603	95,166	85,169	93,239	998,391	27·4	21·4
Coorg ...	448	315	425	491	452	509	607	451	429	411	337	430	5,285	29·26	26·24
Bombay Presidency.	46,932	42,597	52,614	64,291	61,213	46,097	54,309	56,388	53,518	54,494	58,149	57,457	648,019	35·06	31·84
Burma. { Lower ...	17,597	10,466	10,888	11,395	10,846	11,747	16,418	16,554	14,078	12,854	11,790	12,610	151,193	27·15	24·93
Burma. { Upper ...	6,286	5,328	5,966	5,297	4,360	4,647	7,544	8,338	6,532	6,500	7,004	8,691	76,493	26·22	22·46
Ajmer-Merwara...	1,015	939	874	905	1,393	2,063	913	1,805	1,526	1,383	1,827	1,944	15,367	32·22	34·25
Total ...	641,267	505,044	558,004	650,121	685,736	580,840	585,118	646,696	690,722	769,908	769,880	775,070	7,852,330	34·73	35·96

Table XXIV.—Ratio of Deaths from All Causes according to Months.

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Bengal	3·31	2·53	3·01	3·40	2·99	2·37	2·74	2·72	2·83	3·47	3·28	3·37	36·08
Eastern Bengal and Assam ...	3·86	2·38	2·37	2·72	2·60	2·02	2·18	1·69	2·01	2·82	3·02	3·94	31·67
United Provinces of Agra and Oudh	2·76	2·34	2·53	3·12	3·69	3·34	2·42	2·82	3·78	4·35	4·22	3·70	39·07
Punjab	2·67	2·08	2·37	3·44	4·36	2·54	2·11	2·15	2·56	3·81	4·65	4·20	36·94
North-West Frontier Province ...	2·51	1·96	2·23	1·89	2·19	2·41	1·98	1·90	2·61	3·11	5·16	5·89	33·73
Central Provinces and Berar ...	2·77	2·81	2·78	3·07	3·74	3·66	2·74	5·14	5·53	4·14	3·73	3·36	43·47
Madras Presidency	1·9	1·5	1·6	1·5	1·8	2·1	2·9	3·5	3·0	2·6	2·4	2·6	27·4
Coorg	2·48	1·74	2·35	2·72	2·39	2·82	3·36	2·50	2·38	2·28	1·87	2·38	29·26
Bombay Presidency	2·54	2·30	2·85	3·48	3·31	2·49	2·94	3·05	2·90	2·95	3·14	3·11	35·06
Burma ... { Lower	2·08	1·87	1·96	2·05	1·95	2·11	2·95	2·97	2·53	2·31	2·12	2·26	27·15
Burma ... { Upper	2·15	1·83	2·04	1·82	1·49	1·59	2·59	2·86	2·24	2·23	2·40	2·98	26·22
Ajmer-Merwara	2·13	1·97	1·83	1·90	2·88	2·23	1·91	3·37	3·20	2·90	3·83	4·68	32·22

General Population.

Table XXV.—Deaths from Cholera in the different Provinces in India from 1886 to 1906.

Year.	Bengal.*	Assam.	United Provinces of Agra and Oudh.	Punjab.	(a) N.W. Frontier Province.	Central Provinces.‡	Berar.	Madras.	Coorg.	Bombay.	Lower Burma.	Upper Burma.†	Ajmer-Merwara.	Rajputana.	Central India.	Hyderabad (Cantonment stations).	Mysore.
1886 ...	118,368	20,188	34,585	12	...	16,629	976	42,417	...	167	4,027	...	765	573	290	499	80
1887 ...	172,578	7,941	200,628	8,804	...	921	305	58,677	2	36,500	15,982	...	384	2,612	8,868	2,831	811
1888 ...	111,391	9,693	18,764	14,938	...	...	...	...	3	25,771	2,649	...	13	32	791	2,057	1,015
1889 ...	171,103	18,288	48,494	2,836	...	52,588	40,985	76,020	9	34,431	3,740	...	55	6,993	3,344	1,128	1,890
1890 ...	145,885	15,396	80,295	3,401	...	4,787	847	35,388	5	3,259	1,076	...	408	2,740	3,132	...	1,326
1891 ...	229,575	85,582	169,913	10,107	...	21,312	7,958	98,273	7	17,850	2,400	...	532	3,946	13,474	3,102	1,289
1892 ...	259,398	24,552	194,686	75,959	...	39,972	2,030	79,033	58	43,900	6,208	...	2,352	26,760	8,384	53	3,497
1893 ...	126,976	21,849	12,154	639	...	557	1,188	32,209	9	18,853	2,393	...	3	314	127	105	880
1894 ...	236,150	13,497	178,079	113	...	7,043	3,452	42,589	8	33,588	7,428	...	...	2	3,110	1,862	348
1895 ...	177,087	18,961	51,862	549	...	15,306	11,919	21,172	...	8,899	5,150	...	289	1,049	6,043	467	2,334
1896 ...	226,824	17,042	89,148	5,146	...	52,985	12,262	47,842	49	35,404	2,959	...	12	3,797	15,766	525	2,109
1897 ...	196,247	33,246	24,268	622	...	57,131	10,122	143,445	106	57,109	8,538	...	19	1,496	13,262	1,039	4,298
1898 ...	65,020	11,149	2,508	331	...	...	...	65,444	8	4,368	2,972	...	1	6	2	9	1,193
1899 ...	163,628	9,338	8,146	1,816	...	961	541	29,082	...	8,579	4,042	2,050	8	498	...	...	183
1900 ...	345,878	23,761	84,960	28,266	...	63,114	18,378	60,662	...	163,889	3,440	41	4,842	28,719	20,450	3,813	779
1901 ...	110,753	7,468	53,935	180	117	49	17	81,370	58	13,600	3,532	4	50	6	72	1	11,351
1902 ...	159,971	12,658	25,160	371	...	28	16	29,769	...	3,230	1,844	57	32	1,519	12	...	218
1903 ...	203,405	8,360	47,159	14,688	1,358	437	...	27,393	...	9,825	3,346	2,887	...	236	1,110	...	98
1904 ...	137,701	5,588	6,617	716	1	2,967	...	23,109	...	13,156	2,472	508	...	1	150	...	471
1905 ...	446,339	122,312	125,790	2,192	300	1,219	...	16,888	...	5,396	3,511	1,836	...	3	27	64	626
1906 ...	192,596	108,278	149,549	4,232	...	38,768	...	142,811	10	46,119	5,529	2,343	284	4,714	10,147	1,061	7,223

* Excluding Calcutta from 1886 to 1892.
† Statistics from 1886 to 1898 not available.
‡ Statistics not available.
§ Including 30 deaths in cantonments.
‖ Excluding Zamindaris.
¶ Including Berar from 1903.
** Eastern Bengal and Assam.
(a) 1886—1900 included in the Punjab.

Table XXVI.—Deaths from Cholera in British Provinces, by months, during the year 1906.

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population. 1906.	1905.
Bengal	16,263	9,537	13,795	23,886	23,623	17,108	17,288	15,022	13,505	18,994	14,344	15,231	192,596	3·81	2·93
Eastern Bengal and Assam	19,272	9,038	9,284	14,441	13,189	7,137	4,866	2,528	1,427	2,122	8,047	16,487	108,278	3·63	4·77
United Provinces of Agra and Oudh.	826	2,769	2,019	18,422	31,564	24,965	7,399	9,073	18,493	26,055	10,657	3,397	149,549	3·14	2·55
Punjab	2	...	1	5	35	79	821	1,537	1,225	597	17	3	4,232	0·21	·11
North-West Frontier Province.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	·15
Central Provinces and Berar.	1	325	640	1,876	3,227	4,954	2,982	15,913	7,337	861	49	3	38,768	3·26	·10
Madras Presidency ...	2,774	1,247	836	1,015	3,133	14,531	29,968	36,496	20,477	12,954	8,690	10,690	142,811	3·9	·5
Coorg	...	...	...	...	...	...	...	...	...	1	...	9	10	·66	...
Bombay Presidency ...	...	131	2,684	11,047	10,862	6,447	8,428	4,393	1,374	596	508	249	46,119	2·50	·29
Burma { Lower ...	220	341	227	508	407	585	1,929	860	465	196	114	547	5,549	·99	·63
Burma { Upper ...	84	13	13	7	143	524	636	226	249	229	175	1,343	3,804	·68	·63
Ajmer-Merwara ...	...	...	...	...	93	129	24	38	...	...	...	284	·60	...
Total ...	39,442	23,389	29,097	71,211	87,240	76,078	73,279	86,496	64,529	56,832	42,655	46,779	690,519	3·05	1·96

Table XXVII.—Details of the distribution and occurrence of Cholera during the year 1906.

Province.	Mortality in 1906.	Mean mortality of previous 5 years.	Urban mortality.	Rural mortality.	Percentage of villages attacked.	Maximum mortality in any one district excluding towns.	Maximum mortality in any one town.	Month of maximum mortality.
Bengal	3·81	2·33	3·91	3·86	15·69	9·49	14·39	April.
Eastern Bengal and Assam ...	3·63	2·30	2·85	3·64	14·72	21·77	43·69	January.
United Provinces of Agra and Oudh	3·14	1·07	1·59	3·25	11·27	14·76	19·16	May.
Punjab	0·21	0·18	0·34	0·29	1·86	1·42	2·89	August.
N.W. Frontier Province ...	.....	0·18	.....	...	...	...	...	
Central Provinces and Berar ...	3·26	0·08	4·11	3·16	10·64	13·64	38·69	August.
Madras Presidency	3·9	1·9	4·3	3·9	25·98	9·9	50·2	August.
Coorg	·66	·06	...	·06	0·80	·21	...	December.
Bombay Presidency	2·50	·40	2·07	2·56	12·16	7·76	16·93	April.
Burma { Lower	·99	·61	1·77	·88	4·49	6·56	20·48	July.
Burma { Upper	·68	·26	2·02	·66	3·76	4·82	10·17	August.
Ajmer-Merwara	·60	·04	·76	·54	2·71	6·15	1·96	June.

General Population.

Table XXVIII.—Small-pox Mortality.

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Lower Burma.	Upper Burma.	Madras Presidency.	Bombay Presidency.	Ajmer-Merwara.	Coorg.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months—													
January	1,554	430	724	1,266	108	2,033	582	41	3,187	580	10	28	9,800
February	2,238	618	906	1,834	107	1,514	970	32	3,168	694	19	29	11,234
March	2,965	840	1,358	2,129	113	1,477	1,576	67	3,533	811	41	38	13,949
April	3,572	1,059	1,789	1,180	97	1,574	1,698	120	3,025	706	65	31	14,916
May	3,189	913	2,554	2,015	63	1,496	1,068	100	2,657	377	53	48	14,560
June	2,244	891	2,156	1,849	99	1,228	766	80	2,240	271	23	33	11,830
July	1,915	560	1,470	1,390	101	745	822	73	2,368	171	21	15	9,351
August	919	349	708	787	101	419	868	27	2,109	100	13	9	5,806
September	648	291	378	445	90	206	141	33	1,996	51	3	3	4,287
October	658	277	188	370	33	102	113	19	1,712	57	3	7	3,488
November	818	304	256	624	83	113	105	24	1,705	98	8	...	4,225
December	1,489	521	705	1,050	240	180	76	36	2,039	144	14	6	6,460
Total ...	20,409	6,972	13,202	15,239	1,235	12,860	7,903	635	29,840	4,063	321	274	105,583
B.—Annual death-ratio—													
Ratio per 1,000 of population, 1906.	·43	·33	·28	0·66	0·57	0·83	1·42	1·22	0·8	·22	·32	3·50	0·48
Ratio per 1,000 of population, 1905.	·14	·15	·07	0·23	0·39	0·70	1·01	·18	0·5	·92	·26	·73	·21
Difference ...	+ ·29	+ ·18	+ ·21	+ 0·43	+ 0·18	+ 0·13	+ 0·41	+ ·04	+ 0·3	— ·70	— ·01	+ ·57	+ ·27
Mean ratio per 1,000 during 1901-1905.	·40	·29	·16	0·48	0·69	0·39	·44	·24	0·5	·34	·17	·73	0·28
Difference ...	— ·00	— ·04	+ ·12	+ ·18	— ·12	+ ·44	+ ·98	— ·02	+ ·3	— ·12	+ ·40	+ ·57	+ ·20
II.—District mortality excluding towns :—													
Number of districts affected ...	32	23	48	28	4	23	38	11	22	24	1	3	250
Highest district ratio ...	2·05	2·37	2·85	2·44	0·99	3·39	3·02	·66	3·3	·73	4·25	2·92	5·05
Name of that district	Puri	Kamrup	Jhansi	Lahore.	Peshawar	Damoh	Myaungmya.	Pakokku	Bellary	Kanara	Pisangan	Nanjarajpatna.	Puri.
Lowest district ratio	·003	·005	0·1	0·03	0·12	0·02	·23	·004	0·1	·03	·09	·70	·003
Name of that district	Singhbhum.	Sibsagar	Garhwal	Mianwali	Hazara	Burhanpur.	Tavoy	Sagaing	Vizagapatam.	Ahmednagar.	Mangalwar.	Padinalkaad.	Singhbhum.
Number of districts without mortality	None	None	None	1	1	2	1	None	None	None	2	None	2
District death-rate per 1,000 of population.	·37	·21	·28	0·57	0·45	0·85	1·23	·23	0·8	·20	·66	1·84	0·25
III.—Town mortality :—													
Number of towns affected ...	94	29	71	115	6	68	31	5	139	38	4	5	605
Highest town ratio ...	3·43	38·69	3·77	13·01	4·06	9·32	28·94	·68	13·7	2·00	5·35	3·25	33·09
Name of that town	Howrah	Barpeta	Kouch	Pindi Bhattian.	Peshawar	Kalmeshwar.	Wakema	Myingyan	T. C. Adirampatnam.	Karachi	Pisangan	Kodlipet	Barpeta.
Lowest town ratio	·01	·04	·02	·002	0·07	0·02	·05	·04	0·02	·02	·04	·12	0·01
Name of that town	Darbhanga.	Narayanganj.	Kachaun	Delhi	Dera Ismail Khan.	Jubbulpore.	Kyaukpyu	Mandalay	M. T. C. Vizianagram.	Ahmedabad.	Nasirabad	Mercara	Jubbulpore.
Number of towns without mortality.	35	25	35	29	5	36	7	8	94	25	2	None	302
Town death-rate per 1,000 of population.	1·37	·79	·24	1·42	1·85	0·70	2·68	·09	1·0	·34	·42	·85	0·92
IV.—Infantile mortality :—													
Children under 1 year ...	3,708	805	4,709	3,241	243	4,220	623	25	11,121	1,042	103	...	29,737
Children 1-10 years ...	8,012	2,381	7,135	7,938	828	3,460	1,830	399	10,824	1,562	145	...	45,204
Percentage of children in total small-pox mortality.	55·83	45·76	89·64	84·44	93·03	76·65	51·04	34·85	73·54	64·07	91·51	...	68·39

GENERAL POPULATION.

TABLE XXIX.—FEVER MORTALITY.

PROVINCES, DISTRICTS, TOWNS.	Bengal.	Eastern Bengal and Assam.	United Provinces.	Panjab.	North-West Frontier Province.	Central Provinces and Berar.	Lower Burma.	Upper Burma.	Madras Presidency.	Bombay Presidency.	Ajmer-Merwara.	Coorg.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months—													
January	228,693	72,088	101,901	30,849	3,783	18,906	4,550	1,756	22,782	24,118	967	359	388,557
February	75,996	47,001	80,100	22,347	2,830	14,206	3,887	1,407	18,176	20,458	781	250	287,369
March	82,586	46,578	80,326	22,314	3,147	12,969	3,539	1,311	19,313	21,754	649	310	294,296
April	93,708	52,056	89,064	23,830	2,613	15,300	3,649	1,346	19,163	22,388	661	490	324,227
May	91,381	50,019	109,762	34,036	2,984	10,392	3,533	1,232	22,457	21,976	958	323	359,088
June	72,876	44,081	104,684	29,020	3,533	20,238	4,662	1,091	21,860	17,036	720	415	326,556
July	83,654	47,373	81,387	23,708	2,678	12,317	5,293	1,815	26,047	18,668	693	517	305,163
August	85,050	36,750	94,089	23,351	2,611	19,674	5,858	2,001	33,053	20,336	1,244	370	324,387
September	92,491	45,736	126,018	30,521	3,877	26,094	4,932	1,869	32,727	19,708	1,258	359	385,307
October	115,426	64,108	154,624	50,742	5,056	23,766	4,813	1,929	30,458	23,975	1,170	333	476,334
November	114,057	63,099	158,734	64,315	8,919	23,312	4,802	2,323	28,448	32,227	1,630	284	503,040
December	113,777	79,240	135,853	52,976	10,041	20,064	5,504	3,350	31,065	32,069	1,831	360	485,137
Total ...	1,353,675	645,733	1,317,491	407,898	52,039	225,144	64,822	21,429	304,928	274,653	12,892	4,369	4,452,501
B.—Annual death ratios—													
Ratio per 1,000 of population, 1906.	22·47	21·65	27·62	20·38	26·14	18·95	9·77	7·34	8·4	14·86	25·77	23·62	19·69
Ratio per 1,000 of population, 1905.	24·34	23·68	26·92	28·40	20·69	17·43	8·92	6·96	7·2	13·28	21·67	21·46	19·52
Difference ...	—1·93	—3·03	+·70	+1·88	+5·45	+1·52	+·80	+·38	+1·2	+1·58	+4·10	+2·16	+0·17
Mean ratio per 1,000 during 1901-1905.	21·78	23·09	25·29	22·27	19·58	15·53	9·30	6·98	7·9	14·28	24·16	24·36	18·96
Difference ...	+0·63	—1·44	+2·33	—1·99	+6·56	+ 3·42	+0·47	+0·36	+0·5	+·58	+1·61	—·74	+0·71
II.—District mortality excluding towns :—													
Number of districts affected ...	22	22	48	29	5	24	12	12	22	24	17	5	252
Highest district ratio ...	36·14	41·33	57·33	30·86	35·14	33·65	38·15	11·90	22·2	36·31	43·49	23·65	57·33
Name of that district ...	Purnea	Dinajpur	Jalaun	Mianwali	Dera Ismail Khan.	Nimar	Prome	Mandalay	Vizagapatam.	Sukkur	Goclla	Mercara	Jalaun.
Lowest district ratio ...	7·31	8·62	15·46	4·57	22·24	8·21	3·83	3 ·06	1·1	5·04	15·73	19·75	1·1
Name of that district ...	Puri	Sylhet	Garhwal	Simla	Hazara	Buldana	Ma-ubin	Meikt la	Ananta-per.	Belgaum	Dewalr	Yedenal-knad.	Ananta-per.
Number of districts without mortality	None	None	None	None	None	None	None	None	None	None	None	None	None.
District death-rate per 1,000 of population.	23·13	21·88	27·51	20·30	26·72	19·63	10·41	7·51	8·7	15·52	25·40	24·26	20·17
III.—Town mortality :—													
Number of towns affected ...	129	54	206	144	21	204	39	13	230	62	6	5	903
Highest town ratio	59·82	36·12	81·31	47·23	36·14	42·23	24·64	11·45	30·7	46·74	40·04	26·68	81·31
Name of that town... ...	Morshid-abad.	Nawab-ganj.	Nagina.	Makhu	Buffa	Kalmesh-war.	Pyapon	Kyaukse	T. C. Srungav-arapur Kota.	Umarkot	Beawar	Fraserpet	Nagina.
Lowest town ratio	1·66	2·24	11·29	1·22	8·41	1·11	1·67	2·65	0·1	1·89	14·27	1·40	0·1
Name of that town... ...	Muharia	Haila-kandi.	Mirzapur Bindachal	Dharm-sala.	Tonk (notified area).	Deulgaon	Insein	Yamethin	Malaka-sira.	Athni	Nasirabad	Virajend-rapet.	Madaka sira.
Number of towns without mortality	None	None	None	None	None	None	None	None	2	1	None	None	3
Town death-rate per 1,000 of population.	21·80	18·03	29·18	20·71	19·85	13·00	5·44	3·87	5·9	10·51	28·78	16·66	14·68

GENERAL POPULATION.

TABLE XXX—DYSENTERY AND DIARRHŒA MORTALITY.

Provinces, Divisions and towns.	Bengal.	Eastern Bengal and Assam.	United Provinces.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Lower Burma.	Upper Burma.	Madras Presidency.	Bombay Presidency.	Ajmer-Merwara.	Coorg.	Registration India.
I.—Mortality by Provinces—													
A. Deaths by months—													
January	4,636	2,854	1,597	1,001	47	2,107	534	114	3,050	3,319	27	13	20,209
February	3,839	1,776	1,321	676	31	2,068	481	92	2,385	3,005	20	8	14,729
March	4,361	1,816	1,413	768	38	2,120	509	146	2,500	3,859	23	6	18,421
April	4,371	1,873	1,948	1,180	39	3,084	556	240	2,190	2,266	22	5	18,984
May	3,612	2,332	2,758	2,143	78	3,739	798	100	3,042	1,767	75	4	22,648
June	3,047	1,679	2,747	1,383	41	2,391	859	135	4,624	2,007	36	16	22,365
July	3,753	1,995	2,45	1,066	28	2,067	1,592	330	6,819	2,687	43	23	28,738
August	4434	1,697	2,227	1,321	22	6,578	2,400	438	8,272	2,532	100	14	36,913
September	4,108	1,634	2,672	1,669	52	7,513	863	181	7,197	2,475	77	14	33,079
October	4,095	2,587	2,513	2,258	45	4,777	624	121	5,084	4,911	59	12	27,996
November	4,156	3,043	2,249	2,243	62	3,205	467	76	5,148	3,773	37	12	24,471
December	4,448	3,196	2,040	1,674	84	2,564	492	106	5,608	2,745	38	17	23,854
Total ...	48,980	26,912	26,348	17,595	571	42,483	9,180	1,979	61,888	34,736	564	141	305,127
B.—Annual death ratios—													
Ratio per 1,000 of population, 1906.	·95	·90	·55	0·83	0·29	3·58	1·65	·68	4·7	3·34	2·18	·78	1·32
Ratio per 1,000 of population, 1905.	·90	·85	·56	0·68	0·28	3·02	1·43	·44	1·6	3·00	·89	·83	1·17
Difference ...	+ ·05	+ ·05	— ·01	+ 0·15	+ 0·01	+ 0·56	+ 0·22	+ ·24	+ ·03	+ 0·34	+ ·29	+ ·25	+ ·15
Mean ratio per 1,000 during 1901-1905.	·95	·65	·61	0·71	0·28	3·38	1·41	·33	1·3	3·15	2·00	·72	1·28
Difference ...	+ ·01	+ ·25	— ·06	+ ·15	+ ·01	+ 1·20	+ 0·24	+ ·35	+ ·05	+ 0·19	+ 0·18	+ ·06	+ 0·30
II.—District mortality excluding towns—													
Number of districts affected.	32	22	48	29	5	24	18	21	22	26	13	5	253
Highest district ratio...	3·96	5·48	9·17	2·19	0·77	14·00	2·80	·83	7·2	19·80	1·41	·78	14·00
Name of that district ...	Howrah	Lakhimpur.	Garhwal.	Simla	Dera Ismail Khan.	Akola	Thayetmyo.	Magwe	Nilgiris	Khandesh.	Pohkar.	Kiggatnad	Akola.
Lowest district ratio ...	·03	·04	·21	0·28	0·04	0·24	·43	·07	0·5	0·05	·06	·29	·01
Name of that district ...	Purnea	Rajshahi	Mainpuri	Multan	Peshawar	Bhandara	Sandoway.	Kyaukse	Nellore	Larkhana.	Nasirabad.	Nanjarajpatna.	Mainpuri.
Number of districts without mortality.	None	None	None	None	None	None	None.	None	None	None	4	None	4
District death-rate per 1,000 of population.	·84	·89	·43	0·72	0·20	2·58	1·34	·52	2·6	3·16	0·29	·47	1·15
III.—Town mortality—													
Number of towns affected.	126	32	96	140	11	104	28	18	212	62	5	3	809
Highest town ratio ...	10·06	21·26	7·32	10·47	5·49	19·24	6·58	2·78	21·5	23·83	9·23	8·82	49·32
Name of that town ...	Kurseong.	North Lakhimpur.	Ballia	Kalabagh.	Kulachi	Shegaon	Pegu	Mandalay.	M. T. C. Palamcottah.	Sholapur.	Ajmer	Virajendrapet.	Shegaon.
Lowest town ratio ...	·12	·15	·07	·29	0·17	·18	·21	·31	0·1	·24	0·23	·27	·07
Name of that town ...	Sagaest	Sadhaura	Shankot	Sohawa	Kohat	Ratanpur.	Pyapon	Pakokku.	T. G. Paramagudi.	Ahmedabad Cant.	Pisangan.	Sulurpet.	Shankot.
Number of towns without mortality.	3	2	10	4	None	None	2	None	20	2	2	2	44
Town death-rate per 1,000 of population.	2·72	2·38	2·16	2·28	2·25	3·63	2·74	3·07	4·1	4·55	3·56	4·20	3·20

General Population.

Table XXXI.—Plague Mortality.

Provinces or State.		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total. 1906.	Total. 1905.
British Provinces :—															
Bengal		5,436	10,548	19,855	16,832	1,762	338	102	432	565	318	905	2,833	59,619	126,086
Eastern Bengal and Assam		...	...	...	24	...	10	25	15	...	...	...	...	74	6
United Provinces of Agra and Oudh ...		5,681	8,937	16,561	16,309	4,363	305	142	676	868	1,531	3,961	10,506	69,660	183,802
Punjab		2,093	3,779	9,532	28,565	28,559	4,449	167	88	420	1,671	4,915	9,463	91,712	334,899
North-West Frontier Province ...		...	...	39	...	...	...	...	...	...	...	...	1	41	2
Central Provinces and Berar ...		1,264	3,022	3,619	1,700	53	4	15	346	1,884	2,620	1,056	1,938	18,121	12,706
Burma { Lower		204	264	589	533	401	602	979	658	317	356	158	262	5,243	3,045
Burma { Upper		329	577	1,160	390	30	50	91	59	29	36	98	565	3,414	647
Madras Presidency ...		207	139	113	93	32	43	32	26	77	64	46	74	898	5,788
Bombay		2,208	2,812	5,409	6,108	3,595	709	612	2,869	8,435	8,619	5,361	4,801	51,525	71,305
Ajmer-Merwara		...	...	35	3	1	...	...	...	3	18	4	1	68	2,480
Coorg		...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ... { 1906		17,417	29,988	56,933	70,958	38,815	6,510	2,154	5,281	12,613	15,363	17,122	30,444	300,355	...
Total ... { 1905		129,313	138,125	231,937	241,450	140,146	15,702	3,804	6,318	19,661	10,725	9,362	13,353	...	940,821
Native States, etc. :—															
Punjab Native States		321	385	1,437	3,330	3,296	1,128	381	19	50	436	593	1,322	12,748	54,868
Jammu and Kashmir State ...		197	183	481	901	731	99	2	19	30	28	71	86	2,736	2,669
Native States in Central Provinces		...	...	...	...	...	...	...	...	...	...	...	...	...	...
Madras Native States		...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bombay Presidency Native States.		1,065	1,080	1,976	1,973	1,022	314	301	1,551	3,064	4,147	3,298	2,770	22,401	23,020
Baluchistan		...	...	...	6	1	...	...	...	...	...	...	...	7	...
United Provinces (Tehri Garhwal)		...	...	...	...	...	...	...	...	...	...	...	...	...	32
Rajputana		34	45	498	336	35	1	1	1	5	10	9	157	1,132	30,083
Central India		112	155	499	393	60	2	18	763	3,051	3,022	2,023	1,047	12,055	2,836
Mysore		243	184	176	36	24	18	99	305	450	618	528	380	2,960	3,959
Bangalore Civil and Military Station		186	126	115	48	40	36	49	100	77	110	90	100	1,077	1,854
Hyderabad State		187	377	295	48	7	...	...	1	...	211	67	56	1,250	9,008
Total ... { 1906		2,195	2,535	5,478	7,070	5,215	1,598	701	2,758	6,727	8,582	6,679	6,918	56,366	...
Total ... { 1905		14,496	14,620	24,437	35,424	21,289	1,205	619	2,384	3,247	3,808	3,350	3,681	...	128,339
Grand Total { 1906		19,612	32,523	62,411	77,028	43,870	8,869	2,855	7,939	19,350	23,801	23,801	37,362	356,721	...
Grand Total { 1905		144,283	142,745	256,374	276,874	161,435	16,907	4,423	8,702	14,208	14,533	12,732	15,034	1,069,140	...
Calcutta City		118	133	658	971	310	169	42	45	32	42	54	52	2,626	7,372
Bombay City		144	604	2,527	3,984	2,549	344	148	832	142	139	55	46	10,802	14,171
Madras City		16	34	5	...	...	...	...	...	1	...	...	...	56	22

Table XXXII.—Mortality from Respiratory Diseases.

Provinces, Districts and Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Lower Burma.	Upper Burma.	Madras Presidency.	Bombay Presidency.	Ajmer-Merwara.	Coorg.	Registration India.
I.—Mortality by provinces :—													
A.—Deaths by months—													
January	1,773	222	1,896	5,660	135	1,421	387	177	1,786	5,376	41	1	18,185
February	1,055	154	1,642	4,218	123	1,301	359	201	1,480	4,835	35	2	15,305
March	1,138	212	1,578	4,192	135	1,338	390	220	1,641	5,018	32	9	16,703
April	1,127	167	1,595	4,073	109	1,348	338	230	1,720	5,420	22	7	16,201
May	881	150	1,825	5,092	127	1,370	328	245	1,866	4,955	27	1	16,776
June	772	189	1,594	3,877	107	1,110	391	167	1,735	4,201	21	1	14,065
July	937	169	1,450	3,603	107	1,006	333	235	2,037	4,881	21	2	14,801
August	1,032	168	1,710	3,820	112	1,414	496	230	2,416	5,150	38	4	16,503
September	918	173	1,604	4,438	104	1,626	371	221	2,603	4,844	18	3	16,813
October	1,989	230	1,705	5,938	97	1,456	300	235	2,189	4,733	18	4	18,034
November	1,215	188	1,683	6,389	101	1,188	359	243	2,052	4,875	35	5	18,428
December	1,373	367	1,752	6,677	136	1,318	898	220	2,133	5,487	24	4	19,493
Total ...	12,825	2,298	20,159	57,127	1,383	16,609	4,024	2,544	23,378	60,615	322	43	201,307
B.—Annual death ratios :—													
Ratio per 1,000 of population, 1906.	·25	·07	·42	2·84	0·69	1·40	·74	·87	0·7	3·28	·67	·24	0·89
Ratio per 1,000 of population, 1905.	·22	·06	·49	3·03	0·57	1·30	·73	·56	0·5	2·95	1·18	·17	·86
Difference ...	+ ·01	+ ·01	— ·07	— ·19	+ ·12	+ 0·10	— ·01	+ ·31	+ ·2	+ 0·33	— ·51	+ ·07	+ 0·03
Mean ratio per 1,000 during 1901-05	†	†	†	3·78	0·40	†	†	†	0·4	3·15	·49	·07	†
Difference ...	†	†	†	+ 0·06	+ ·29	†	†	†	+ ·3	+ 0·13	+ ·18	+ ·17	†
II.—District mortality excluding towns :—													
Number of districts affected ...	32	8	48	29	5	24	12	11	20	24	8	2	343
Highest district ratio ...	1·35	·09	6·31	11·27	0·47	4·67	1·12	·79	1·14	0·37	·40	·08	1·11·47
Name of that district... ...	Puri	Lakhimpur.	Naraipur	Gurdaspur.	Bannu	Betul	Bassein	Lower Chindwin.	Nilgiris	Kaira	Pohkar	Yedenalknad.	Gurdaspur.
Lowest district ratio ...	·001	·001	·009	0·11	0·05	0·07	·03	·02	0·1	0·15	·08	·05	·001
Name of that district ...	Purnea	Tippera	Bara Banki.	Multan	Kohat	Narsinghpur.	Sandoway.	Kyaukse	Ganjam	Upper Sind Frontier.	Kolar	Nanjarajapatna.	Purnea.
Number of districts without mortality.	None	None	None	None	None	None	None	None	2	None	9	3	14
District death-rate per 1,000 of population.	·15	·03	·23	2·53	0·37	1·28	·35	·18	0·5	2·15	·07	·03	0·65
III.—Town mortality :—													
Number of towns affected ...	89	34	97	144	11	89	28	10	176	59	4	3	744
Highest town ratio	5·19	2·40	18·56	12·63	9·43	9·04	7·79	17·67	11·8	20·03	4·79	2·41	20·03
Name of that town	Calcutta	Dhubri	Rath	Pathankot	Haripur	Deori	Toungoo	Tsangdwingyi.	M. T. C. Coonoor.	City of Bombay.	Ajmer suburb.	Virajendrapet.	City of Bombay.
Lowest town ratio	·04	·05	·05	0·37	0·44	0·13	·08	·12	0·2	0·41	·23	·15	·04
Name of that town	Krishnagar.	Chittagong.	Deoband	Khangah Dogran.	Kohat	Raipur	Yandoon	Ywamethin	T. C. Bobbili	Larkhana	Pleasgan.	Mercara	Krishnagar.
Number of towns without mortality.	40	30	9	None	None	15	11	2	86	6	2	2	162
Town death-rate per 1,000 of population.	1·76	·19	2·89	5·60	4·19	2·47	3·26	6·82	1·4	10·82	2·98	3·49	3·64

† Not available.

TABLE XXXIII.—GENERAL POPULATION VACCINATION.

A.—TOTAL PRIMARY AND RE-VACCINATIONS SUCCESSFUL CASES AMONG THE CHILDREN, COST OF THE SPECIAL VACCINATION DEPARTMENT, ETC., DURING THE OFFICIAL YEAR 1906-07.

PROVINCE.	NUMBER OF PERSONS VACCINATED BY THE SPECIAL AND DISPENSARY STAFFS COMBINED.		PERCENTAGE OF SUCCESSFUL CASES* TO TOTAL OPERATIONS.		NUMBER OF CHILDREN SUCCESSFULLY VACCINATED BY THE SPECIAL AND DISPENSARY STAFFS COMBINED.		Average number of operations performed by each vaccinator of the Special Staff.	Total cost of the Special Department.	Average cost of each successful case vaccinated by the Special Department.
	Primary.	Re-vaccinations.	Primary.	Re-vaccinations.	Under one year.	1 to 6 years.			
								Rs.	Rs. a. p.
Bengal	1,874,076	162,297	99·24	65·90	814,772	943,050	1,012	1,73,229	0 1 5
Eastern Bengal and Assam	1,262,929	56,003	98·55	72·11	360,810	720,542	1,026	90,635	0 1 2
United Provinces of Agra and Oudh.	1,571,486	103,574	97·72	84·43	930,316	517,672	1,824	1,50,971	0 1 6
Punjab	607,909	97,310	99·34	78·12	487,441	90,739	2,648	99,605	0 2 8
North-West Frontier Province	76,604	15,289	98·95	83·67	47,258	17,481	2,023	11,217	0 2 2
Central Provinces and Berar	525,977	91,404	98·56	75·38	401,063	95,056	1,978	65,263	0 1 11
Madras Presidency	1,437,924	113,676	93·41	74·24	490,417	645,932	1,721‡	2,94,881	0 3 6
Coorg	9,166	2,066	93·13	75·23	919	4,841	1,209	2,752	0 4 7
Bombay Presidency	593,381	37,519	95·93	71·04	430,300	89,102	1,466	3,26,124	0 9 6
Burma	370,399	59,253	90·64	53·43	77,858	175,396	1,685	1,27,528	0 6 1
Ajmer-Merwara	11,973	127	97·87	82·68	9,1299	2,444	807	2,867	0 3 10
TOTAL	8,341,794	738,899	97·21	72·85	4,050,283	3,302,345	1,432	1,345,072	0 2 7

* Excluding those the results of which were not known.
† Including the vaccinations performed in cantonments.
‡ Excludes average of work done by each medical subordinate.

B.—VACCINATION OPERATIONS PERFORMED BY THE SPECIAL AND DISPENSARY ESTABLISHMENTS SEPARATELY, DEATHS FROM SMALL-POX, ETC., DURING THE OFFICIAL YEAR 1906-07.

PROVINCE.	Population.	NUMBER OF PERSONS VACCINATED (PRIMARY AND RE-VACCINATIONS COMBINED).			Ratio of successful vaccinations per 1,000 of population.	Percentage of annual estimated births at 40 per 1,000 of population successfully vaccinated.	DEATHS FROM SMALL-POX.*	
		By special Department.	By Dispensary staff.	Total.			Number.	Ratio per 1,000 of population.
Bengal	31,625,771	1,891,224	145,949	2,037,273	37·80	39·46	22,206	·43
Eastern Bengal and Assam	30,788,134	1,292,430	25,602	1,318,032	41·33	29·30	9,972	·23
United Provinces of Agra and Oudh.	47,960,667†	1,674,799	201‡	1,675,000	33·31	45·49	13,202	·28
Punjab	20,293,834	784,249	970	705,219	33·06	60·05	13,239	·66
North-West Frontier Province	2,104,812	90,612	1,281§	91,893	39·67	56·13	1,127	·57
Central Provinces and Berar	13,621,559	593,349	24,032	617,381	42·06	73·61	9,889	·83
Madras Presidency	38,408,131	1,551,352	248	1,551,600	35·66	31·99	29,840	·8
Coorg	189,607	19,884	348	11,212	54·58	12·72	234	1·30
Bombay Presidency	21,640,585	629,356	1,505	630,861	25·36	49·71	4,063	·22
Burma	10,477,508	411,731	18,521	429,652	33·06	18·58	8,540	1·01
Ajmer-Merwara	476,912	12,100	.....	12,100	24·79	47·86	271	·57
TOTAL	237,578,920	8,861,286	218,717	9,080,303	35·41	42·62	109,583	·48

* For the Calendar year.
† Includes 16,010 persons enumerated at the Ajudhya Fair.
‡ No special vaccinators are attached to dispensaries. Operations performed by medical subordinates.
§ There were no special vaccinators attached to the dispensaries. Operations were performed by Hospital Assistants.

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REPORT

ON

SANITARY MEASURES IN INDIA

IN

1907-1908.

VOL. XLI.

Presented to both Houses of Parliament by Command of His Majesty.

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IN

1907-1908.

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REPORT.

The following Report on Sanitary Measures in India during the year 1907 is prepared for presentation to Parliament. It deals with the health of European and Native troops, of prisoners in jails, and of the general population; also with vaccination, medical institutions, including hospitals, dispensaries and medical schools, with lunatic asylums, and with sanitation.

I.—EUROPEAN ARMY.

Sickness and mortality in 1907.

Sickness and mortality in 1907.—Apart from the prevalence of plague, which scarcely affects the statistics of troops, the year 1907 was not an unhealthy one for the general population of the country. Among European troops the rates of admission to hospital, of constantly sick, of mortality, and of invaliding were all much lower than those of the previous year, and of the antecedent quinquennium; the first three rates were, indeed, the lowest ever recorded among the European army in India. On an average strength of 69,332, the admissions to hospital were in the ratio of 756 per 1,000, against 871 in 1906, the constantly sick rate fell from 51·4 to 46·4; the death rate from 10·43 to 8·18 and the invaliding rate from 28·36 to 25·50 per 1,000. The statistical tables have been arranged this year under the headings Northern and Southern armies instead of under those of the three Commands and two Divisions as in the years 1904 to 1906: and although the administrative change did not come into force until the 1st of June 1907, the statistics have been worked out as though it had taken effect from the 1st of January 1906.

The following statement shows the sickness and mortality among European troops in the Northern and Southern armies during 1907 and 1906:—

Armies.		Average strength.	Ratio per 1,000 of average strength.				
			Admissions.	Constantly sick.	Deaths.	Invaliding.	Total loss.
Northern	1907	36,551	744	46	8·34	22	30
	1906	37,549	836	51	9·51	23	33
Southern	1907	31,026	786	50	8·32	31	39
	1906	31,258	929	54	11·65	36	48
India	1907	69,332	756	46	8·18	26	34
	1906	70,272	871	51	10·43	28	38

It will be seen from the above table that the admission, constantly sick and invaliding rates were lower in 1907 among the troops in the Northern than in the Southern army, while the death rate was only ·02 higher, and in both the armies as well as for India as a whole there was a considerable improvement under all the above heads compared with the previous year. As in 1905 and 1906 the health of the European troops in the 2nd (Rawalpindi) Division and the 3rd (Lahore) Division was better than in the other Divisions during 1907.

The decrease in sickness was due chiefly to fewer admissions on account of venereal diseases, ague and simple continued fever, (the chief causes of sickness during the year), but nearly all the more important diseases were less prevalent than in 1906. Venereal diseases caused an admission rate of 90 per 1,000 against 117 in 1906, ague 152 against 176 and simple continued fever 37 against 56. Thirty-seven per cent. of the total sickness resulted from these three causes. The principal causes of death were, as usual, enteric fever and abscess of the liver, the death rate from the former being 2·77 per 1,000 against 3·19 in 1906 and from the latter 1·01 against 1·52. Thirty-four per cent. of the total deaths were due to enteric fever and 12 per cent. to hepatic abscess. The mortality from each of the more important diseases except tubercle of the lungs was lower than in the previous year. The chief causes of invaliding were, in order, ague, debility, tubercle of the lungs, valvular disease of the heart, enteric fever, disordered

action of the heart, and syphilis, these causes together accounting for 889 invalidings (one-half of the total number) as compared with 939 in 1906. The number of men sent home on account of ague rose from 135 in 1906 to 266, and on account of tubercle of the lungs from 92 to 107, but only 76 men were invalided for syphilis and 86 for enteric fever, as compared with 120 and 115 respectively in the previous year. The admission rate among European troops during 1907 was nearly one and a quarter times as high as that among Native troops, while the constantly sick rate was more than twice as high and the invaliding rate was more than four times as high. The death rates among European and Native troops are not fairly comparable.

The following table shows the sickness and mortality among the European troops according to geographical groups :—

Groups.	Average strength.	Ratio per 1,000 of average strength.		
		Admissions.	Constantly sick.	Deaths.
Burma Coast and Bay Islands	1,294	726	46	13·14
Burma Inland	1,727	778	45	2·90
Bengal and Orissa	1,953	791	55	15·87
Gangetic Plain and Chutia Nagpur	6,556	677	43	9·76
Upper Sub-Himalaya	13,391	798	45	9·63
North-Western Frontier, Indus Valley, and North-Western Rajputana.	4,621	1,062	55	5·19
South-Eastern Rajputana, Central India and Gujarat ...	5,730	842	45	12·39
Deccan	10,260	709	48	8·97
Western Coast	1,372	738	53	3·64
Southern India	3,537	807	60	8·20
Hill Stations	11,689	625	39	5·39
Hill Convalescent Depôts and Sanitaria	3,515	797	62	6·26
India ...	69,332	756	46	8·18

Of the above 12 groups the admission and the death rates recorded in seven were higher than that for the European army as a whole. The most unhealthy group, judged by the admission rate, was, as in the previous year, the North-Western Frontier and Indus Valley with a rate of 1,062 per 1,000. Of the stations with a strength of over 1,000 the highest death rates were recorded in Fort William (14·90) and Rangoon (14·66).

Fevers.—Ague ranked first in the list of causes of admission to hospital. In India as a whole the months of September and October were the most malarious. The admission rate from intermittent fever fell from 176 per 1,000 in 1906 to 152 and the death rate from ·23 to ·13. The admission rate among troops in the Northern army fell from 179 to 159, and among those in the Southern army from 175 to 145. Malarial fevers were more prevalent among the troops of the Northern than of the Southern army, and as regards Divisions the Peshawar, Mhow and Quetta Divisions recorded the highest admission rates. Ague, as in the previous year, accounted for 20 per cent. of the sickness from all causes. The treatment and especially the "after treatment" of patients suffering from malaria is now carried out much more thoroughly than formerly; treatment by intra-muscular injections of quinine is adopted for severe cases in a number of stations, and in nearly all stations the after-treatment of patients is continued for at least six weeks after their discharge from hospital. This practice has reduced considerably the number of re-admissions on account of relapses, and has therefore been an important factor in reducing the admission rate. As regards the prevention of primary attacks it is being realized that for the European soldier measures of prophylaxis "for the individual" are of most service, and in some stations a distinct advance has been made in this connection by the provision of mosquito curtains to all European soldiers. The other measure of personal prevention most extensively practised was the administration of prophylactic doses of quinine. Among other methods which were tried for the prevention of malaria were (1) the practice of keeping troops in hill stations until the malarial season in the plains was over, the removal of troops into camp during the malarial season (an application of the principle known as "the segregation of Europeans"), and the free distribution of quinine to natives living in the neighbourhood of barracks and to *punkah coolies* and servants.

The admissions for *enteric fever* were 910 or 13·1 per 1,000 of strength, as against 1,095 or 15·6 in 1906, and the deaths were 192 against 224, or a death rate of 2·77 against 3·19. The number constantly sick was 200·4 against 224·1. The average length of stay of patients in hospital during 1907 was about 80 days against 75 in 1906, and the total loss of service was 73,146 days against 81,800. The disease was more prevalent and fatal among troops in the Southern than among those in the Northern Army. Among the stations with an average strength of over 1,000 a death rate of 9·43 was recorded in Ahmednagar, 6·85 in Mhow and 5·07 in Secunderabad.

The most important of the recommendations made by the Standing Committee on enteric fever—all except the last of which are at present being acted upon, were (1) that accommodation be provided in the hills for isolating enteric fever convalescents, away from other troops; (2) that all men, British and Native, whom it is proposed to employ in connection with food intended for British troops, in kitchens, officers' and non-commissioned officers' messes, regimental and other institutes, Government and regimental dairies, bakeries, mineral water factories, etc., should first be medically examined in order to detect and so prevent the employment of any who may be harbouring the infection of enteric fever; (3) (*a*) that all men whom it is proposed to employ in this manner should, if not already protected by a previous attack of the disease, be inoculated, the operation being repeated when one year has elapsed since the previous inoculation, and (*b*) that in selecting men for such employment preference should be given to those whose age and service in India make them less liable to infection; (*c*) orderlies nursing enteric fever cases should not be allowed at the same time to attend other cases; (4) that a special corps of male nurses, whether of the Royal Army Medical Corps or men specially enlisted for India, should as soon as possible, be instituted for nursing enteric fever cases.

Venereal diseases.—Venereal diseases were the cause of 12 per cent. of the total sickness during 1907 and of over 5 per cent. of invaliding in the European Army. The admission rate per 1,000 was 90 as against 117 in 1906. The fall in the rates relating to these diseases, which is one of the most remarkable features of the health statistics of European troops in India during recent years, is common to all kinds of venereal disease. It is attributed to a number of causes, among which may be mentioned, as being the more important, the efforts of regimental and other officers' to occupy the spare time of the men in healthy pastimes and to make the regimental institutes attractive and comfortable; the better education and higher moral tone now existing among soldiers generally; increased knowledge of the danger of these diseases; less indulgence in alcohol; and the more thorough treatment now carried out in all cases. The admission rate among troops of the Northern army was 80·1 per thousand as compared with 102·7 among those of the Southern army. As regards Divisions the admission rates were highest among troops in the 9th (Secunderabad) Division and the 10th (Burma) Division and lowest in the 4th (Quetta) Division. The stations in the Northern army with the highest admission rates were Fort William (237·7), Agra (166·2) and Delhi (151·0) and in the Southern army, Madras (220·6), St. Thomas' Mount (218·3), Meiktila (209·1), Wellington (192·3) and Bellary (169·3). The number of men constantly sick in hospital from these diseases was 735 against 865 in the previous year and the average stay of a case in hospital was 43 days against 38 days. The total loss of service thus involved amounted to 268,374 days. The deaths from these diseases numbered three (or ·04 per mille) and the invalidings 97 (1·40 per thousand) against 11 and 131 respectively in 1906.

Abscess of the liver.—From hepatic abscess there were 70 deaths giving a ratio of 1·01 per 1,000 of strength, against 107 deaths and 1·52 per 1,000 in 1906. The mortality was greater in the Southern than in the Northern army.

Other diseases.—Cholera was almost absent, the number of cases recorded being only three and the number of deaths two against 72 and 46 in 1906, and 16 cases and 9 deaths in 1905, the number being, with the exception of 1899, (when only one case occurred), the lowest on record.

Small-pox caused only 30 admissions and one death against 87 admissions and four deaths in 1906 and 99 cases with one death in 1905.

The admission rate from dysentery fell from 15·2 to 11·7 and the death rate from ·53 to ·33. The disease was more prevalent and fatal in the Southern than in the Northern army, and as regards divisions it was most prevalent among troops in the 5th (Mhow), the 9th (Secunderabad), and the 8th (Lucknow) Divisions.

There were 8 cases of plague and 3 deaths, against 17 cases and two deaths in 1906.

Influenza caused an admission rate of 12·5 per mille as against 11·4 in 1906. Peshawar, Cherat, and Nowshera were the only stations in which the disease prevailed in epidemic form.

The admission rate (1·6 per mille) from tubercle of the lungs was the same as in the previous year, but the death rate rose from ·17 to ·20.

Invaliding.—The loss by invaliding during 1907 amounted to 1,768 men equal to 25·50 per thousand of strength against 1,993 or 28·36 in 1906. The invaliding rate was 22·00 in the Northern against 31·07 in the Southern army. A striking feature of the statistics is the increase in the number of men invalided for ague, doubtless the result of the very malarious autumn of 1906. Of the 266 men invalided for ague 234 were under 30 years of age. The number of invaliding for enteric fever was 86, for debility 177, valvular disease of the heart 98, disordered action of the heart 79, tubercle of the lungs 107 and for syphilis 76.

As regards the influence of age and length of residence in India upon invalidings 52 per cent. of the total number invalided were under 25 years of age and 85 per cent. were under 30, while 34 per cent. were of less than two years' service in India and 74 per cent. were of less than 5 years. In August 1907 action was taken to ensure that only those invalids should be sent to England who would not be likely to recover their health by a change to one of the hill stations in India.

II.—NATIVE ARMY.

Sickness and mortality in 1907.—The health of the Native army during 1907 was good, the constantly sick, invaliding and death rates being the lowest on record.

The change in the headings under which the tabular abstracts are arranged this year has already been referred to in Section I and for Native as well as for European troops the statistics have been worked out as if the change had come into force on the 1st of January 1906.

The ratios of sickness and mortality during 1907 and the previous year were as follows :—

Armies.		Average strength.	Ratio per 1,000 of average strength.		
			Admissions.	Constantly sick.	Deaths.
Northern Army	1907	61,163	712	24	7·28
	1906	62,453	740	25	6·45
Southern Army	1907	50,484	584	21	5·68
	1906	50,885	687	23	7·61
India	1907	126,392	629	22	6·27
	1906	127,853	684	23	6·57

In 1907 the admission, constantly sick and death rates were all higher in the Northern than in the Southern army. Taking India as a whole the rates were all more favourable than in the previous year.

The following statement gives the principal statistics of the Native army arranged in geographical groups, for 1907 :—

Groups.	Average strength.	Ratio per 1,000 of average strength.		
		Admissions.	Constantly sick.	Deaths.
Burma Coast and Bay Islands	1,297	563	22	2·31
Burma Inland	2,807	629	26	3·21
Assam	964	1,059	30	1·04
Bengal and Orissa	2,022	907	33	4·95
Gangetic Plain and Chutia Nagpur	5,999	444	16	5·68
Upper Sub-Himalaya	20,904	582	20	6·46
North-West Frontier, Indus Valley and North-Western Rajputana.	18,024	951	28	8·77
South-Eastern Rajputana, Central India and Gujarat	13,094	656	21	4·58
Deccan	16,794	492	19	5·06
Western Coast	1,652	930	31	7·87
Southern India	3,880	415	16	5·93
Hill Stations	22,710	634	25	8·37
India	126,392	629	22	6·27

The chief causes of sickness were intermittent fever, dysentery, simple continued fever, "other respiratory diseases," venereal diseases and anæmia and debility while pneumonia, intermittent fever, enteric fever and tubercle of the lungs were the chief causes of mortality.

In six of the 12 groups the constantly sick rate was higher than that for the whole Native army, and in four the mortality was greater. The highest mortality was recorded in the North-Western Frontier, Indus Valley and North-Western Rajputana groups. Out of 39 stations with an average strength of over 1,000 in 1907 there were three in which sickness and mortality were very high. At Dera Ismail Khan the admission rate was 1363·4 per mille and the death rate 11·53, the chief causes of the large amount of sickness being malaria, dysentery and other respiratory diseases. In Dehra Dun the admission rate was 1173·4 and the death rate 9·63, intermittent and simple continued fevers being the chief causes of sickness. At Abbottabad the admission rate was 951·8 and the death rate 10·74, ague, "other respiratory diseases" and dysentery being the chief causes of sickness.

The Native troops suffered less than the European troops from influenza, small-pox, enteric fever, simple continued fever, diarrhœa, hepatic affections, and venereal diseases, but more from the other chief causes of sickness.

Intermittent fever.—The chief cause of sickness was, as usual, ague, which contributed over 35 per cent. of the total admissions. The admission rate was 220 per mille as against 262 in 1906. The disease was considerably more prevalent in the Northern than in the Southern army. October and November were, as usual, the months of greatest prevalence.

Pneumonia.—Pneumonia was, as usual, the chief cause of death in the Native army and contributed 31·8 per cent. of the total deaths, the death rate being 1·99 per 1,000 of the average strength, against 1·56 in 1906. The death rate from this disease among the Native soldiers was more than five times as great as that among European troops.

The disease was most prevalent as well as fatal during the year among troops located in Group VII, North-Western Frontier, Indus Valley and North-Western Rajputana.

Other diseases.—There was a considerable decrease in the prevalence of cholera among Native troops, 34 cases and 24 deaths being reported as against 94 cases and 62 deaths in 1906. The admission and death ratios from enteric fever were 1·4 and ·35 per mille respectively as against 13·1 and 2·77 for European troops. Remittent fever accounted for 4·3 per cent. of the total mortality. The admission rate from simple continued fever was 16·6 per 1,000 against 29·6 in 1906 and 14·3 in 1905. There were 85 admissions to hospital, and 56 deaths from plague as against 147 admissions and 83 deaths in 1906. The admission rate from tubercle of the lungs (2·5 per 1,000) was the lowest since 1896, but the death rate fell from ·52 per 1,000 in 1906 to ·33. The disease was, as usual, much more prevalent among Gurkhas than among other classes, the admission and death rates for the Native army, excluding Gurkhas, being 2·3 and ·24 per thousand, respectively, and for Gurkhas 4·8 and 1·03. Dysentery was rather less prevalent than during the previous year but the number of deaths was nearly the same. Venereal diseases caused an admission rate of only 14·7 per 1,000; they were about six times more prevalent among European than among Native troops. The prevalence of these diseases in the Native army has decreased steadily during recent years though not as rapidly as among European troops. The greater incidence of the disease among Gurkhas than among men of other classes was not so marked as in 1907; the admission rate among Gurkhas being only 20 per 1,000 as compared with a rate of 14 per 1,000 among the remainder of the troops.

Invaliding.—The chief causes of invaliding were tubercle of the lungs, debility, rheumatism, venereal diseases and intermittent fever. The invaliding rate was 5·76 per 1,000 against 7·05 in 1906, the respective numbers discharged being 728 in 1907 and 902 in 1906.

III.—GENERAL POPULATION.

Meteorology.—The chief meteorological feature of the year 1907 was the late arrival of the monsoon currents, their persistent feebleness except for a brief period, chiefly in August, and their extremely early withdrawal. The hot weather did not set in till May and the conditions of that season were prolonged in north-west India, the United Provinces and Central India till the third week in July, when the monsoon broke. On the mean of the whole country, the monsoon rainfall was 9 per cent. short of the normal.

The year was more unhealthy than 1906, a total of 547,293 more deaths being recorded. The larger number of deaths was mainly due to the greater prevalence of plague to which cause was due twice as many deaths as were recorded from cholera and small-pox combined, and more than three times as many as occurred in the previous year. The mortality from cholera, small-pox, and dysentery and diarrhœa was at a lower rate than in 1906, and that from fever and respiratory diseases at a slightly higher rate.

Registration of vital statistics.—Births and deaths are now recorded among a population of 225,921,260 persons: up to the preceding year births were recorded among a smaller population, registration being confined to thirteen towns in Upper Burma, but it has now been extended to the area under registration for deaths in that province. In British India there are still areas not under registration, which are represented in the Madras Presidency by the hill tribes of the Ganjam and Vizagapatam districts, the people of the Laccadive and Amindivi Islands and an estate in Kurnool; in Eastern Bengal and Assam, the hill districts; in Bengal, Angul; in the North-West Frontier Province, certain tracts of the Hazara district; certain areas in Lower Burma and considerable areas in Upper Burma. The population figures used are those of the census of 1901, which become less accurate for purposes of calculation as the date of the census recedes.

Births and deaths.—The mean birth rate for the year was 37·65 per thousand of the population compared with 37·80 in 1906, ranging in the larger provinces between 52·45 in the Central Provinces and 30·8 in Madras. In five provinces the birth rate exceeded that of the previous year and in seven the birth rate of the year was higher than the death rate. The mean death rate was 37·18 compared with 34·73 per thousand of population in 1906, five provinces recording rates in excess of those in the preceding year. The highest rate, 62·10 per thousand, was returned by the Punjab and the lowest, 24·3, by Madras. Gauged by the number of deaths, April was the most unhealthy month of the year. Male and female infants under one year of age died at the rates of 221·72 and 209·33 per thousand born, respectively, the corresponding rates in 1906 having been 228·30 and 217·52.

Chief diseases.—Cholera was present in every province during 1907, but the mortality was at a lower rate than in 1906, the ratio per thousand of population being 1·81 and 3·05 respectively. The decrease was shared by all provinces except Bengal (death-rate 4·07 per thousand), Coorg (1·04) and Lower Burma (1·43). Small-pox also occurred in every province, but the death rate was ·46 per thousand compared with ·48 in 1906. The highest small-pox death rate, 1·17 per thousand, was recorded in Coorg. The deaths of children under ten years of age amounted to 69·70 per cent. of the total small-pox mortality. The death rate from "fevers" was 19·76 against 19·69 per thousand in 1906. The rate in 1907 is the highest recorded in any year since 1900 and it is probable that many plague deaths were recorded as being due to fever. Assuming, for the reasons given in this report for the previous year, that 25 per cent. of the fever deaths are due to malaria, the death rate from this cause would be 4·9 per thousand of the population. In six of the twelve provinces the death rate from fever in 1907 was higher than in 1906. The highest ratio per thousand was recorded in the United Provinces (28·31) followed by the North-West Frontier Province (27·44), Coorg (26·95), Ajmer-Merwara (25·31), Bengal (23·18) and Eastern Bengal and Assam (21·17). Dysentery and diarrhœa caused a lower death rate, 1·25 per thousand, than in 1906, 1·32 per thousand, and all but three provinces participated in the fall. Great variations occurred in the death rates attributed to respiratory diseases, the highest rates being recorded in the Punjab (3·20 per thousand), Bombay (3·14) and the Central Provinces (2·64); in all the other provinces the rates were below the mean of 1·0 per thousand for British India. Deaths

from plague were recorded in every province during the year 1907, but very small numbers in Eastern Bengal and Assam (8 deaths), Ajmer-Mewara (13) and Coorg (2). The total plague deaths in British India increased from 300,355 in 1906 to 1,166,223 in 1907, and the death rate per thousand of population from 1·33 to 5·16. The increase was common to all provinces, except Eastern Bengal and Assam, Upper Burma and Ajmer-Merwara. The greatest increase occurred in the Punjab where the death rate rose from 4·56 to 30·27 per thousand, followed by the United Provinces (6·90 per thousand) and Bombay (5·06 per thousand). The plague death rate of 1907, like that in 1905, presented some peculiar features: it was, as usual, at its height during March, April and May, declined rapidly to a very low point during the hottest months and rose with the approach of autumn, but the rise instead of continuing steadily throughout the last four months of the year, ceased in October and the least mortality occurred in December. The special investigations of plague, begun in April 1905, are still being carried on under an Advisory Committee representing the India Office, the Royal Society and the Lister Institute. The results of the investigations are appearing in special numbers of the *Journal of Hygiene*, and a comprehensive summary of the work done and the results achieved, prepared by Major G. Lamb, I. M. S., formerly Senior Member of the Commission in India and now a member of the Advisory Committee, was published as a pamphlet entitled "*The Etiology and Epidemiology of Plague*," and copies were widely circulated.

The deaths from the chief diseases and from all causes in the several British provinces in 1907, were as follow:—

Provinces.	Cholera.		Small-pox.		Fevers.		Dysentery and Diarrhœa.		Plague.		Respiratory Diseases.		Deaths from all causes.		
	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000. 1907.	Ratio per 1,000. 1906.
Lower Burma ...	7,964	1·43	1,532	·28	137,266	26·28	8,947	1·61	5,922	1·07	3,924	·70	140,472	26·84	27·15
Upper Burma ...	414	·74	1,330	·46	21,979	7·53	1,175	·47	3,277	1·12	1,857	·64	76,220	26·13	26·13
Eastern Bengal and Assam.	77,181	2·58	8,693	·29	631,197	21·17	20,463	·68	8	·0002	2,752	·09	873,752	29·30	31·87
Bengal	305,702	4·07	39,066	·87	1,171,540	23·18	51,670	1·02	83,602	1·65	15,039	·29	1,906,192	37·72	38·08
United Provinces ...	22,458	·47	22,645	·47	1,350,405	28·31	22,368	·47	328,802	6·90	22,117	·46	2,07 2,536	43·46	39·99
Punjab	432	·02	11,082	·55	408,481	20·16	15,091	·75	608,685	30·27	64,386	3·20	1,218,729	60·10	38·74
North-West Frontier Province.	266	·14	769	·40	52,361	27·44	554	·29	1,547	·81	1,893	·99	67,017	35·12	37·72
Ajmer-Merwara ...	1	·002	407	1·04	11,117	23·31	494	1·04	13	·03	372	·78	14,831	29·63	34·28
Central Provinces ...	4,291	·36	3,826	·32	213,908	18·0	46,820	3·94	37,774	3·18	31,327	2·64	495,603	41·70	43·16
Bombay Presidency ...	7,650	·41	1,862	·10	260,322	14·09	53,708	2·91	93,609	5·06	53,063	2·14	606,606	32·82	35·76
Coorg	137	1·04	211	1·17	4,868	26·95	375	2·08	2	·01	77	·43	6,349	35·15	37·26
Madras Presidency ...	81,565	2·2	23,455	·6	284,430	7·8	60,326	1·7	2,872	·10	24,038	·7	883,016	24·3	27·40
Total ...	408,102	1·81	103,988	·46	4,464,881	19·76	282,191	1·25	1,166,223	5·16	226,419	1·0	8,399,623	37·18	34·78

Lower Burma. The average rainfall, except in three districts, was much in excess, and the price of rice in all but the Rangoon and Thaton districts was above the average. The birth rate rose from 32·33 to 32·65 per thousand of population, and the death rate fell from 27·15 to 26·84. The rural and urban death rates were 24·58 and 42·18 per thousand respectively.

Cholera was more prevalent than in 1906, the ratio per thousand rising from ·99 in that year, to 1·43. Deaths from the disease were recorded in every month of the year. Small-pox prevailed to a less extent, the death rates being ·28 in 1907 against 1·42 in 1906. Fever mortality increased from 9·77 to 10·28 per thousand of the population. The sales of quinine increased largely and arrangements are proposed to issue the drug in tablet form. There was a slight variation only in the recorded mortality rate from dysentery and diarrhœa, *viz.*, 1·61 and 1·65 per thousand in 1907 and 1906 respectively. Plague increased, the districts chiefly affected being Rangoon (death rate 8·38), Amherst (3·44), Henzada (1·54) and Bassein (1·25). The mortality from plague rose steadily from January to April and then gradually declined.

Upper Burma. Less rain fell than in 1906, and some scarcity was experienced in certain parts of the province at the end of the year. From 1907 both births and deaths are registered in eleven districts. The mean birth rate was 33·14 per thousand of population. The death rate of 26·13 was 0·9 below the rate for 1906, but still in excess of the quinquennial mean of 21·33. The rural and urban death rates were 24·39 and 39·69 respectively.

Cholera was less prevalent, the recorded mortality falling from ·80 to ·14 per thousand in 1907. Three districts were free from the disease and in four others the deaths in each did not exceed ten. There was more small-pox than in the previous year, the mortality per thousand rising to ·46 from ·22. Fevers accounted for a mortality rate of 7·53 or ·19 more than in 1906. The death rate from dysentery and diarrhœa fell from ·68 to ·47 per thousand. Plague was absent from three of the eleven districts, and in one other district three deaths only were recorded. The mean death rate from the disease was 1·12 per thousand of the population.

Eastern Bengal and Assam.

The rainfall of 1907 was generally deficient and the prices of food grains ruled high, but there was no marked distress in consequence. On the whole the year was a healthy one. The birth rate fell to 37·01 from 37·38 in 1906, the quinquennial mean being 39·31. The diminution of the birth rate in ten out of the fourteen districts in Eastern Bengal continues, and while no reason for this is apparent, there is no evidence of defective reporting. The death rate showed a decrease, from 31·67 in the previous year to 29·30, but in three districts marked increases on the average rate of the past five years were recorded. The rural and urban rates were 29·45 and 22·67 per thousand of population, respectively.

On Tea-gardens the birth rate was 27·6 per thousand against 28·3 in 1906, and the death rate 29·2 against 22·0.

Cholera was considerably less severe, the death rate per thousand falling from 9·63 in 1906 to 2·58 in 1907. Although the Rajshahi district recorded the highest rate (8·75), Bakerganj (6·03) and Noakhali (7·59) are districts in which the disease is always more or less prevalent, a condition due to the difficulty of obtaining pure drinking water in many places. Small-pox caused a death rate of ·29 compared with ·23 in 1906, the highest rate being recorded in Barpeta (9·15), the head-quarters of the Mahaparushiyas who object on religious grounds to vaccination: the sect is, however, yielding to persuasion and endemic small-pox in Barpeta is at last diminishing. The fever death rate fell from 21·65 to 21·17 which is below the quinquennial mean of 23·01. The number of deaths from kala azar have been declining steadily since 1902 when the number of deaths was 6,319; in 1907 they numbered 2,227. The dysentery and diarrhœa death rate was ·68 compared with ·90 in 1906; the greatest mortality was, as usual, recorded in the Tea-districts of the Assam and Surma Valleys. Plague accounted for eight deaths only: the immunity of this province from the disease is a notable feature of the present epidemic.

Bengal.

The rainfall was irregular and generally deficient and prices were high. The recorded birth rate was 37·70 against 37·32 in 1906 and the quinquennial mean of 39·08. The highest district rate was recorded in Palamau (54·59) and the lowest in Jessore (29·58). The death rate rose from 36·08 per thousand in 1906 to 37·72 in 1907, the quinquennial average being 34·68. The increase is attributed to the high prices of food grains and general unhealthiness of the year, due chiefly to more deaths from fever, cholera and plague. The mean rural death rate was 37·82 and the urban rate 36·23.

The cholera mortality rate increased from 3·81 in 1906 to 4·07. No district was entirely free from the disease and out of 529 circles, 500 were affected. The highest rates were returned from the districts of Cuttack (15·41), Palamau (13·42) and Balasore (10·29). The disinfection of wells was carried out with good results, and the people are beginning to appreciate the measure. Small-pox mortality increased from ·43 to ·57 per thousand. Fevers accounted for a death rate of 23·18 compared with 22·41 in 1906, the largest number of deaths occurring in the last quarter of the year. High fever rates were recorded in Birbhum (38·27), Purnea (36·96), Palamau (33·19) and Nadia (32·38). Anti-malarial operations were continued in the towns of Ranaghat, Jagadispur and North Barrackpore. The proposals of the Drainage Committee in connection with the prevalence of malarial fever in the Presidency Division have been submitted to the local Government. The higher death rate from dysentery and diarrhœa, 1·02 compared with ·96 in 1906, is said to be probably due to the severe prevalence of cholera. Plague mortality increased from a rate of 1·17 per thousand in 1906 to 1·65 in 1907. The Patna and Saran districts again suffered most as they did in the previous year, recording death rates of 13·45 and 12·45 per thousand respectively. A localized outbreak of pneumonic plague in Darjeeling caused seven deaths, but stringent measures stamped out the disease.

City and Port of Calcutta.

The birth rate in Calcutta City rose from 17·7 in 1906 to 19·1 in 1907: both rates are believed to be short of the truth, but it is hoped that the new system of enquiries

by peripatetic registrars will result in improved registration. The death rate in 1907 was 37·6 against 35·7 in the previous year, but on the estimated population of the City which has considerably increased, the rate is 33 per thousand. The increased death rate of the year, as calculated on the census population, was mainly due to more deaths from cholera and plague. From the former cause there were 3,803 deaths (death rate 4·4 per thousand) which shows a severer incidence than during any year of the past decade. It is computed that the City lost 1,000 inhabitants as a result of the cholera outbreak which followed the *Ardhodoya Jog* festival in February 1908. This festival falls at long intervals, the previous ones having fallen in February 1891 and in the same month in 1864. From plague 3,591 deaths were recorded, two thirds of this number occurring in April and May: the death rate rose to 4·2 per thousand from 3·0 in 1906. A total of 3,123 inoculations were performed which is considered to be too small a number to be effective as a general prophylactic measure. The small-pox mortality showed a considerable diminution and with this the vaccination returns exhibited diminished activity. The infantile mortality rate of 293 per thousand of the births was below the rate of the preceding year.

Altogether 21,561 European seamen arrived in the Port of Calcutta during 1907 against 20,118 in 1906, and the daily average European population was 1,139 or two more than in the previous year. Of the total of twelve deaths, two were due to cholera. The average native floating population, which is estimated at 29,768, furnished 188 deaths or six more than in 1906, the ratio per thousand being 6·31 and 6·11 respectively. Of the total deaths 65 were due to cholera compared with 48 in the previous year and 23 to fever compared with 37: there was no death from small-pox.

United Provinces.

The climatic conditions were abnormal. The spring rainfall was in excess and the monsoon set in late, and terminated early. The birth rate increased from 40·22 to 41·18, the highest rates being recorded in Shahjahanpur (54·95) and Hardoi (54·53) and the lowest in Ballia (28·57) and Dehra Dun (28·52). There were a larger number of deaths in 1907 than in 1906, the rate per thousand rising to 43·46 from 39·07. Of the 48 districts the death rate in 19 exceeded the provincial mean. The Muzaffarnagar district recorded the highest rate, (87·97), of which plague, (55·70), contributed a considerable share, and Dehra Dun the lowest, (26·91). The rural and urban death rates were 42·57 and 55·46 respectively.

The cholera death rate fell considerably, from 3·14 in 1906 to ·47. Of 106 towns with a population exceeding 10,000, no deaths were reported from 45 and in 31 others the number did not exceed ten. Small-pox was absent from 42 of the towns and 49 others were but slightly affected. The death rate from the disease, however, rose from ·28 in 1906 to ·47 per thousand of the population. The fever mortality increased, a death rate of 28·31 being returned against the rate of 27·62 in 1906: the greatest number of deaths were recorded in December. The reduction in the quantity of quinine sold is attributed to a larger free distribution of the drug. Dysentery and diarrhœa were less prevalent; the death rate in urban areas was nearly six times as high as that in rural areas. The deaths from plague greatly exceeded the number in the previous year, the mortality rate per thousand rising from 1·46 to 6·90. The highest district rate was recorded in Muzaffarnagar (55·70). The Almora district was the only one entirely free from plague, but in six other districts the number of deaths did not exceed ten.

Punjab.

The spring rainfall was in excess, and after a brief monsoon which terminated abruptly about the end of August, no rain of any importance was received. Prices were adversely affected during the latter part of the year and wages showed a corresponding rise in certain districts. Fewer births were recorded and the rate per thousand fell from 43·7 to 40·8. The decrease is attributed to the greater prevalence of plague and to malarial fever in the preceding autumn. The number of deaths increased considerably, the ratio rising from 36·9 per thousand in 1906 to 62·1, which is the highest rate recorded since registration began in the Punjab 41 years ago. The increase was entirely due to plague, omitting which the death rate would have been 31·8 per thousand.

Out of 32,834 towns and villages, cholera appeared in 67 only, a total of 437 deaths being recorded which gave a death rate of ·02 against ·21 in 1906. Small-pox mortality fell from ·66 to ·55 per thousand, the latter rate being the average for the preceding quinquennium. The fever mortality of the two years 1906 and 1907 approximated closely, the rates being 20·28 and 20·16 respectively. It is believed that in some districts deaths from plague were recorded as being due to fever. Dysentery and diarrhœa were less prevalent, the death rate falling from ·87 in 1906 to ·75 in 1907: the urban rate was more than three times that in rural areas. Plague was present in 27 districts, and in two districts only, Simla and Dera Ghazi Khan, did it not appear.

The death rate rose from 4·56 per thousand in 1906 to 30·27, and in 14 districts the rate exceeded 20 per thousand of the population. The highest district rates were returned by Gujranwala (80·61), Gujrat (70·08) and Shahpur (62·58), and among towns Dinga (Gujrat district) recorded a rate of 119·20 and Hodal (Gurgaon district) a rate of 107·10. March, April and May were the months of greatest prevalence.

North-West Frontier Province.

The rainfall was generally below the average, but prices ruled easier than in 1906. The birth rate declined to 32·5 from 38·6, the decline being attributed to severe malaria in the autumn and winter of 1906 and to the prevalence of chest complaints in the colder months. The death rate increased from 33·7 to 35·1 the rise being due to the causes which influenced the birth rate.

Cholera had been absent from the province in 1906, but during 1907 deaths occurred in the districts of Hazara (10 deaths), Peshawar (39) and Kohat (217). Small-pox mortality declined from ·57 to ·40 per thousand. Of the total of 1,127 cases, 668 occurred in the Peshawar district. Fever deaths increased, owing it is said to debilitated constitutions and not to any increased prevalence of malaria: the death rate per thousand was 26·14 and 27·44 in the two years 1906 and 1907. The number of dysentery and diarrhœa deaths were 544 or 27 less than in the previous year. Plague became epidemic for the first time in 1907, and of the total of 1,547 deaths, 1,302 were recorded in the Peshawar district.

Central Provinces.

The deficient rainfall of the year caused a failure of the crops and a rise in prices. The birth rate increased from 51·72 to 52·46, and in 17 of the 24 districts the rate exceeded 50 per thousand; the highest rate recorded was in Saugor (59·80) and the lowest in Bandara (47·07). Fewer deaths occurred than in 1906, the rate per thousand falling from 43·47 to 41·70: in three districts the rate was in excess of 50 per thousand, the highest being recorded in Buldana (58·32), but in ten the rate was less than 40 per thousand, the lowest being in Bhandara (32·37). The urban and rural rates were 45·11 and 41·30 respectively.

Cholera was considerably less prevalent, the death rate falling from 3·26 to ·36. Of the 20 Central Provinces districts, four were free from cholera, but all the four Berar districts were affected. Small-pox mortality fell from ·83 to ·32 per thousand, and the fever death rate also showed a fall, from 18·95 to 18·0, the reduction occurring in 16 of the 24 districts. Malaria was less prevalent, but it is suspected that deaths from plague and other diseases with febrile symptoms were recorded as due to fever. Dysentery and diarrhœa accounted for a higher mortality than in the previous year, the ratio per thousand being 3·94 and 3·58 respectively. In the Berar districts the death rate from this cause works out to 9·63 and in the Central Provinces districts to 2·22 per thousand of population. Of the total plague deaths, more than half occurred in the Berar districts; the mean death rate rose from 1·53 to 3·18. Of the 24 districts two were practically free from plague and two others suffered to a slight extent only.

Bombay.

Irregular rainfall and the failure of the monsoon in the autumn resulted in prices being high and specially so in the last two months of the year. The birth rate fell from 33·84 to 33·03 per thousand, but two districts, West Khandesh (55·95) and East Khandesh (51·29), recorded rates in excess of 50. The lowest rates were recorded in Sind districts, *viz.*, Upper Sind Frontier (14·91) and Hyderabad (14·66). The death rate fell from 35·06 to 32·82, lower rates than in the previous year being recorded in all but six districts. The highest district rate was 56·76 in Satara and the lowest 17·85 in Upper Sind Frontier. The urban rate was 38·19 and the rural 31·54.

The cholera death rate was ·41 per thousand to which it fell from 2·50 in 1906, and in the last 20 years on five occasions only has the rate been below that recorded in 1907. Of the 26 districts in the Presidency, eight were free from cholera and five were only slightly affected. Small-pox mortality fell to ·10 from ·22 in 1906, the Sind and Gujarat registration districts being practically free from the disease. Of the total deaths about 52 per cent. occurred among children under 10 years of age. Fevers caused a death rate of 14·09 against 14·86 in the previous year, and dysentery and diarrhœa 2·91 against 3·34. The plague mortality rose from 2·78 per thousand to 5·06, the highest rate being recorded in the Satara district (31·76). The Upper Sind Frontier district was entirely free from plague, and in the Thar and Parkar district one death only was registered. The seasonal incidence of plague in the Bombay Presidency shows a double rise in the year, which is markedly different from the course usually followed in the other provinces.

City and Port of Bombay.

The birth rate fell from 21·24 to 19·97 per thousand of population, a result anticipated on account of deficient rainfall and its consequent evils, and also on account of difficulties attending the work of registration. The amalgamation of the Vaccination and Health Departments is, however, expected to help in respect of enquiries as to the

occurrence of births. The death rate declined to 39·56, from 54·07 per thousand in 1906, and although the rate of mortality was lower than in any year in the past decade it is considered, even after allowing for the ravages of plague, that the health conditions scarcely reveal any improvement on the period before plague appeared. The number of plague deaths decreased from 10,823 (death rate 11·06) to 6,389 (death rate 6·53). There were only 86 deaths from small-pox against 276 in the previous year, giving a ratio of ·08 per thousand.

Cholera was less severe, causing 439 deaths (death rate ·44) of which no less than 357 occurred among Hindus, including low castes. The fever deaths (3,633) were also fewer than in 1906, excluding which year there has been a distinct decrease since 1902 in the mortality due to this cause. The infantile mortality rate was 423·6 per thousand births to which it fell from a rate of 534 per thousand in 1906.

In the Port of Bombay 894,848 persons, crew and passengers of 11,708 vessels were examined, and the clothing and bedding of 92,151 was disinfected. In all 60 vessels were disinfected, including 15 which had on board cases of plague or cholera. At inspections, 19 cases of plague, 9 of cholera, 33 of small-pox, 14 of jigger, 1 of scarlatina and 3 of leprosy were detected.

Madras. On the whole the rainfall of the year was slightly in excess of the average: prices which had risen in the preceding year showed a further rise and were in excess of the average, a condition which is attributed to a demand for food grains, probably for export, and not necessarily to unfavourable seasons. The birth rate was 30·8 or ·1 below the rate in 1906, but ·2 above the quinquennial mean. The rates ranged between 39·1 in Madras and 37·3 in Guntur, and 23·1 in Madura. In 15 districts the rate exceeded 30 per thousand. The death rate fell from 27·4 to 24·3. In all but four districts the rates were lower in 1907 than in the preceding year and is generally attributed to cholera being less prevalent. In districts the highest rate was recorded in Madras (40·8) and the lowest in Madura (18·3). The urban death rate was 28·5 and in rural areas 23·7 per thousand of the population.

Deaths from cholera were reported from all districts, and the disease was present throughout the year in 11 of the 23 districts of the Presidency. The mean death rate from the disease fell from 3·9 to 2·2. Favourable reports were received on the purification of water supplies by permanganate of potash. Small-pox was present in 20 districts, and the death rate was ·6 against ·8 in the previous year. Of 61 municipal towns, no deaths were recorded in 19 and in 23 others the number in each did not exceed four. Fever was, as usual, less prevalent in the Presidency than in any other of the chief provinces; the mortality per thousand fell from 8·4 in 1906 to 7·8 in 1907. For the third time the districts of Ganjam (death rate 18·1) and Vizagapatam (death rate 16·1) returned the highest rates. Deaths from plague increased to 2,872 from 898 in the previous year: no cases were reported from nine districts and in six others only a few imported ones. The Bellary, Nilgiris and Salem districts were the only ones in which the number of deaths was at all considerable.

Madras City. The birth rate rose from 36·5 to 38·8 per thousand and approached the quinquennial mean of 39·2 which it would have exceeded but for the abnormal rate of 45·6 recorded in 1905. Careful enquiries have shown that there is very little error in the birth registration in the City. The death rate fell to 40·5 from 46·6 in the previous year.

According to the chief diseases the number of deaths were as follows—the figures in brackets are those for the preceding year—cholera 691 (564), small-pox 49 (620), plague 3 (56), fevers, excluding enteric fever 42 deaths, 4,301 (4,028), dysentery and diarrhœa 4,466 (5,704). The death rate among children under one year of age fell from 341·2 to 270·7 per thousand born.

Red Sea Pilgrim Traffic. Pilgrimage to the Hejaz during the year 1906-07 was conducted under revised orders, which provide for embarkation from Bombay only, after the medical examination of all pilgrims and disinfection of their clothes and baggage. A further medical examination of all vessels is made at Aden and Perim. A total of 27,205 pilgrims left in 35 ships during the season 1906-07, which is the largest number on record. In the absence of the usual report no information is available as to the health of the pilgrims on the voyage and at the Kamaran detention station. About 400 Indian pilgrims are reported to have died at Jeddah after the Haj; the causes of death have, however, not been indicated; and owing to the want of funds about 3,000 have remained in the country. During the period February to August 1907, 24,293 pilgrims returned to Bombay in 33 ships. Deaths occurred on every ship during the homeward voyage, collectively numbering 412 persons.

IV.—JAILS.

Sickness and mortality in 1907.—The health of the prisoners in jails was good, and the death rate on an average daily population of 107,675 (or 2,407 less than in 1906) was only 18·51 per thousand, which is the lowest rate ever recorded. In the jails of India and Burma (excluding the Andamans) the average daily number of prisoners of all classes (convicts, under-trial and civil prisoners) was 73,264 or 2,130 less than in 1906, the rate of admission to hospital was 624 per thousand compared with 658 in that year and the death rate was 17·72 per 1,000 compared with 19·27. In all provinces, except the Punjab, Bombay and the Central Provinces the death rates were lower than in 1906, and in Burma the exceedingly low rate of 11·88 per 1,000 was recorded.

The following statement shows the sickness and mortality among all classes of prisoners in the jails of the various provinces for 1907 as compared with 1906 :—

Provinces.	1906.			1907.		
	Ratio per 1,000 of average strength.			Ratio per 1,000 of average strength.		
	Admissions.	Constantly sick.	Deaths.	Admissions.	Constantly sick.	Deaths.
Burma	280	16	14·81	256	14	11·88
Eastern Bengal and Assam	912	43	29·69	861	38	29·55
Bengal	1,009	38	23·36	938	36	16·94
United Provinces of Agra and Oudh ...	603	27	16·56	603	29	15·03
Punjab	737	26	15·75	707	30	19·81
North-West Frontier Province	1,465	36	25·38	1,209	35	17·75
Central Provinces and Berar	598	19	13·82	526	18	19·44
Bombay	639	31	20·69	693	32	20·96
Madras	417	18	21·77	376	19	18·79
India excluding Andamans	658	27	19·27	624	27	17·72

Chief diseases.—The diseases which caused the highest admission rates were intermittent fever (190·2 per 1,000), dysentery (67·9), abscesses, ulcers and boils (70·5), and diarrhœa (34·4) ; and the most common causes of death were dysentery (death rate 2·57 per 1,000), tubercle of the lungs (2·74) and pneumonia (2·90). There was a decrease in the incidence of all diseases except pneumonia, other respiratory diseases, and abscesses, ulcers and boils. The admission rate from intermittent fever fell from 207·2 in 1906 to 190·2 per 1,000, which, with the exception of the rate recorded in 1905 (181·7 per thousand), was the lowest on record, and the death rate was ·79 per thousand as compared with rates of ·75 and ·91 in 1906 and 1905 respectively. Remittent fever caused 100 admissions, which is less than in any previous year and the death rate was only ·15 per thousand as compared with ·21 in 1906 and ·28 the mean ratio of the five-year period from 1901-1905. Dysentery was never less prevalent and never caused a lower mortality in the jails of India than during 1907. Diarrhœa caused 3,207 admissions to hospital and 75 deaths, the admission and death rates per thousand being 34·4 and ·80, respectively, as compared with 39·1 and ·73 in 1906. There was a considerable increase in the prevalence of pneumonia, the number of cases being 1,074 as compared with 963 in 1906 and 896 in 1905. The death rate also increased from 2·55 per thousand in 1906 to 2·90. The Punjab, the United Provinces, the North-West Frontier Province and Bombay were the administrations in which the disease was most prevalent. The admission and death rates from tubercle of the lungs were only 7·5 and 2·74 per thousand respectively, as compared with 8·8 and 3·21 in 1906, and the death rate with the exception of that recorded in 1895, was the lowest on record. Cholera was less prevalent than in 1906; it caused 140 admissions and 55 deaths. There were 65 admissions and only six deaths from small-pox compared with 82 admissions and nine deaths in 1906. The number of cases diagnosed as enteric fever was 65 with nineteen deaths against 102 cases and 18 deaths in the previous year. Influenza caused 454 admissions to hospital; more than half the cases occurring in Eastern Bengal and Assam. Plague accounted for 59 cases with 30 deaths as compared with nineteen and eight respectively in 1906. Fifty-six cases of epidemic dropsy with five deaths and 107 cases of beri-beri with twelve deaths were reported during the year.

Burma. The average daily strength of the jail population in Burma rose from 13,369 in 1906 to 13,721 in 1907, and there was more or less overcrowding during some periods of the year in twenty of the thirty central and district jails. The admission, constantly sick and death rates fell from 280, 16 and 14·81 per thousand respectively, in 1906 to 256,14 and 11·88 per thousand in 1907. The three rates were the lowest on record for Burma. Abscesses, intermittent fever, and dysentery were the principal causes of sickness, and tubercle of the lungs and pneumonia the principal causes of death. The admission rate from intermittent fever fell from 49·7 per thousand in 1906 to 36·4, the rate being far lower than that in the jails of any other administration; and only three deaths from this disease were recorded. Dysentery caused 275 admissions to hospital as compared with 243 in 1906, but there were only ten deaths as compared with twenty in that year. From tubercle of the lungs there were only 67 cases with 42 deaths during the year. Proposals for the construction of a separate jail, or of a ward as an annexe to one of the existing jails, to accommodate 50 tuberculous prisoners are under consideration by the local Government. Five cases of cholera (three fatal) and two of plague (one fatal) occurred during the year.

Eastern Bengal and Assam. The daily average strength of the prisoners in Eastern Bengal and Assam rose from 6,871 in 1906 to 7,310 in 1907 and there was overcrowding in 19 of the 21 principal jails. The admission and constantly sick rates in 1907 were lower than in 1906, and the death rate was 29·55 per thousand as compared with 29·69 in that year. There were fewer cases of pneumonia, dysentery, scurvy, anæmia and debility, and abscesses, but nearly all the other principal diseases were more prevalent. In the Barisal jail there were only 92 cases of dysentery and no death as compared with 360 cases with eight deaths in 1906 and 395 cases with nine deaths in 1905. The fatality of ague was as usual high in comparison with its fatality in other administrations. Cases diagnosed as beri-beri occurred in four jails, and cases diagnosed as epidemic dropsy in two jails.

Bengal. The mean daily population of the jails in Bengal fell from 14,857 in 1906 to 14,408 in 1907, but in thirty of the thirty-six jails overcrowding existed during a part or the whole of the year. The rate of admission into hospital fell from 1000·8 per thousand in 1906 to 938·2, the constantly sick rate from 38·0 to 35·6, and the death rate from 23·36 to 16·94, which is considerably lower than the rate recorded in any previous year. The principal causes of admission into hospital were intermittent fever (36·74 per cent. of all admissions), dysentery (15·26) and diarrhœa (7·66); and the principal causes of death were tubercle of the lungs (18·4 per cent. of all deaths), dysentery (16·8) and pneumonia (15·6). There was an increase in the number of admissions and deaths from intermittent fever. Dysentery was much less prevalent than it has ever been, the admission rate being only 143·2 per thousand and the death rate 2·85 per thousand as compared with rates of 187·6 and 5·72 respectively in 1906. In nineteen jails there was no death from this disease during the year. The admission rate from tubercle of the lungs fell from 15·1 per thousand in 1906 to 12·5 in 1907 and the death rate from 4·31 to 3·12. Only nine cases of cholera (with five deaths) occurred during the year and 11 cases of plague (with nine deaths).

United Provinces of Agra and Oudh. The average daily strength of the prisoners fell from 24,872 in 1906 to 23,887 in 1907, but there was overcrowding during part of the year in twenty-five of the fifty-six jails. The constantly sick rate was higher than in 1906 but the death rate was only 15·03 per thousand as compared with 16·56 in that year. Pneumonia was considerably more prevalent and fatal than in the previous year but there was a satisfactory decline in the admission and death rates from tubercle of the lungs, from 7·6 and 2·85 per thousand respectively in 1906 to 5·4 and 1·67 in 1907. The death rate from dysentery was 1·93 per thousand as compared with 1·89 in 1906. Death rates over 30 per 1,000 were recorded in six jails where the average annual strength was over 150. In the Basti jail an outbreak of "beri-beri" which caused 81 admissions to hospital and four deaths occurred during November and December. This was the only jail in which cholera appeared during the year; there were two cases of which one was fatal.

Punjab. The daily average jail population in the Punjab was 11,154 as compared with 11,744 in 1906. The rate of admission to hospital decreased from 736·6 per 1,000 in 1906 to 706·8 in 1907, but the constantly sick rate rose from 26·0 to 30·3 and the death rate from 15·75 to 19·81. The admissions from intermittent fever, which was the principal cause of sickness, were less by 845 than in 1906. Tubercle of the lungs, pneumonia and dysentery were the principal causes of death. Tubercle of the lungs caused 118 admissions into hospital, and 43 deaths as compared with 86 admissions and 45 deaths in 1906. Dysentery was less prevalent and caused less mortality than in the

previous year. No case of cholera occurred in the jails and only fifteen cases of plague (eight of which were fatal).

North-West Frontier Province.

In the jails of the North-West Frontier Province sickness and mortality were considerably less than in the previous year, the admission rate being 1208·8 per 1,000 and the death rate 17·75 per 1,000 as compared with rates of 1464·6 and 25·38 respectively in 1906. Intermittent fever caused 35·59 per cent. of the total admissions to hospital, but the admission rate was only 430·3 per 1,000 as compared with 809·2 in 1906, and there was no death from this disease during the year. Dysentery caused 104 admissions into hospital against 102 in 1906, tubercle of the lungs ten against ten, and pneumonia 29 against 31. Diarrhœa was more prevalent than in 1906, and caused 122 admissions into hospital and one death.

Central Provinces and Berar.

The average strength of the jail population in the Central Provinces and Berar fell from 3,329 in 1906 to 3,241 in 1907, but the number of under-trial prisoners increased, and there was overcrowding in the wards for these prisoners in eight district jails. The admission and constantly sick rates were lower than in the previous year, but the death rate rose from 13·82 per 1,000 to 19·44. Intermittent fever, abscesses and dysentery were the principal causes of admission into hospital, and dysentery and tubercle of the lungs were the principal causes of death. Dysentery caused 14 deaths of which seven occurred in the Raipur Central Jail. In all the jails there were only twelve admissions to hospital for tubercle of the lungs of which eight proved fatal. No case of cholera and only three of plague occurred in the jails during the year.

Bombay.

The daily average population of the jails in Bombay decreased from 7,925 in 1906 to 7,537 in 1907, but there was overcrowding to a greater or less extent in nine or ten jails. The admission, constantly sick and death rates were 693, 32 and 20·96 per 1,000 in 1907 as compared with 689, 31 and 20·69 per 1,000 respectively in 1906. Intermittent fever, which was the principal cause of sickness during 1907, and pneumonia, which was the principal cause of death, were both more prevalent than in 1906, but there was a satisfactory decline in the admission and death rates from dysentery, and no case of cholera occurred during the year. Pneumonia caused 149 admissions to hospital and 44 deaths, of which 62 admissions and 18 deaths occurred in the Hyderabad Central Prison and 53 admissions and 13 deaths among the Sind gang. Tubercle of the lungs caused 44 cases and 19 deaths as compared with 40 cases and 15 deaths in 1906.

Madras.

The daily average strength of the prisoners in the Madras Presidency fell from 10,428 in 1906 to 10,166 in 1907. The rate of admission to hospital fell from 416·5 per 1,000 in 1906 to 375·6 and the death rate from 21·77 to 18·79. Malarial fevers and dysentery were the principal causes of sickness, and cholera and dysentery the principal causes of death. The admission rate from malarial fevers was 57·2 per 1,000 as compared with 60·2 in 1906 but ten deaths were returned under this heading as compared with only two in that year. The admission rate from dysentery was considerably lower than in 1906, and there were only twenty-nine deaths from this disease as compared with 45 in that year. Cholera caused 106 admissions to hospital and 39 deaths, of which 74 admissions and 32 deaths occurred in the Coimbatore Central Jail. The origin of the outbreak was not definitely traced, but cholera was prevalent in many parts of the district and a number of prisoners came from places infected with the disease. The admission rate from tubercle of the lungs fell from 9·7 per 1,000 in 1906, to 6·5, the lowest rate since 1894, but there were 25 deaths from this disease as compared with 26 in 1906.

Andamans.

The average strength of the convict population during 1907 was 14,411 or 27 less than in 1906, and there was no overcrowding during the year. In comparison with previous years the health statistics were favourable but in view of the very careful selection of convicts who are sent to these islands they are still far from being satisfactory. The admission and constantly sick rates were as usual very high, but the death rate was only 23·59 per 1,000 as compared with 27·30 in 1906 and 38·96 in 1905. The reduction in the death rate was due to smaller numbers of deaths from dysentery, malaria and pneumonia, and it was greatest among new arrivals. Dysentery, malaria and tubercle of the lungs continue to be the most important diseases of the settlement. The admission rate from dysentery was higher than in 1906, but the death rate fell to 3·12 per 1,000, which is lower than in several of the Indian administrations. The admission rate for ague was less than in the previous year. The admission rate for tubercle of the lungs rose from 6·9 per 1,000 to 8·2, but there was a slight decrease in the death rate. A hospital for female prisoners suffering from this disease was constructed at South Point during the year.

V.—VACCINATION.

Vaccination operations in British India are performed by the special department and by the dispensary staff, the vast majority by the former. During the year 1907-08 the total number of operations amounted to 9,169,873, excluding 44,820 cases in Bengal, of which particulars were received too late to be incorporated in the returns. Of the total number of cases, which exceeded by 89,570 the number during 1906-07, but was less by 108,023 than the number in 1905-06, 8,351,530 were primary cases and 818,343 revaccinations. All but four provinces showed an increase: in Burma and the Central Provinces the fall compared with 1906-07 was comparatively large, but in the North-West Frontier Province and Coorg the decreases were not great. The quality of the work, as a whole, showed an improvement, the percentage of success in primary cases being 97·65 against 97·21 and in revaccinations 75·45 against 72·85, in the two years 1907-08 and 1906-07, respectively. Of the children successfully vaccinated, 4,197,807 were under one year of age and 3,167,152 between one and six years old. The mean proportion of the population protected against small-pox was 36·07 per thousand, compared with 35·41 in the previous year: the highest ratio, 53·74, was, as usual, recorded in Coorg, and the lowest, 25·89, in the Bombay Presidency.

The cost of the special department amounted to £92,672 compared with £89,671 in 1906-07, but the average cost of each successful case, *viz.*, $2\frac{7}{12}$d, was the same in both years.

The following statement shows the results of vaccination during the year 1907-08.

Province.	Population among whom vaccination was carried on.	Number of persons vaccinated (including re-vaccinations) by Special Department and dispensary staff.	Ratio of successful vaccinations per 1,000 of population.	Number of children successfully vaccinated.		Percentage of annual estimated births at 40 per 1,000 of population, successfully vaccinated.
				Under one year of age.	Between one and six years of age.	
Burma	10,477,508	406,533	31·90	82,606	160,070	19·71
Eastern Bengal and Assam	30,788,134	1,358,644	42·20	378,846	699,595	30·76
Bengal	51,075,829	2,013,551†	37·98	866,668	865,900	42·39
United Provinces of Agra and Oudh. ...	47,960,667*	1,702,139	33·78	958,006	475,348	49·94
Punjab	20,293,834	707,683	31·57	458,755	93,647	56·51
North-West Frontier Province	2,022,252	99,855	41·98	46,142	17,845	57·04
Ajmer-Merwara	476,912	14,575	29·48	10,455	2,828	54·81
Central Provinces and Berar	13,621,559	599,247	42·66	400,257	96,082	73·46
Bombay	21,438,769	637,648‡	25·89	430,489	93,075	50·20
Coorg	180,607	11,150	53·74	754	4,175	10·44
Madras	38,227,818	1,627,848	38·61	565,429	666,387	36·98
Total ...	236,563,889	9,169,873	36·07	4,197,807	3,167,152	44·36

* Includes 16,010 persons enumerated at the Ajodya Fair.

† Excludes 44,820 operations particulars of which received too late.

‡ Including 811 secondary operations.

In all the provinces, except the Central Provinces, the North-West Frontier Province and the two small provinces of Ajmer-Merwara and Coorg, depots are maintained for the manufacture of vaccine.

The total number of vaccination operations in Burma during 1907-08 was 23,119 fewer than during the previous year, the decrease being greater among primary cases than among revaccinations. The quality of the work was, however, better, 91·86 per cent. successful against 90·64 in primary cases and 58·97 against 53·43 in revaccinations. The decline in the Tharrawaddy district to about half the work done in the two preceding years, is attributed to inefficiency and want of tact on the part of the vaccinators; the continuous fall in Henzada during the past three years is said to be the result of past records being unreliable and grossly exaggerated, and the decreases in Akyab and Rangoon to the efforts to check epidemics of small-pox which left few unprotected persons. Apathy and opposition to vaccination are present in the province, and inoculation is still freely carried on in non-municipal areas for which legislation is contemplated to render the practice illegal as it is in municipalities. The Meiktila depot continues to prepare the vaccine supply for the whole province, except Rangoon which obtains its requirements from the municipal vaccine depot.

Eastern Bengal and Assam.

The vaccination operations in Eastern Bengal and Assam increased by 40,612 during 1907-08, but the percentage of success, 98·23 and 70·21 in primary cases and revaccinations, respectively, were below the previous year's rates. During the past six years vaccination has advanced in the Eastern Bengal districts, but not so in the Assam districts. The absence of progress in the latter is attributed to the ill-health of the people and the absence of competent inspectors of vaccination who are difficult to secure. The Vaccination Department was revised in April 1907, and the standard of education for the admission of candidates has been raised: all inspecting officers are to receive a training in departmental work as soon as arrangements to do so can be made. The working of the Bengal Vaccination Act, V of 1880, is said to be unsatisfactory, owing to the failure of the staff to perform their duties efficiently. The Shillong Vaccine depot worked satisfactorily: many improvements have been effected and the outturn of vaccine has been doubled. Orders have been issued to discontinue vaccination from the arm and locally vaccinated calves. Inoculation is still practised in a subdivision of the Surma Valley and in the Lakhimpur district.

Bengal.

The net increase of 21,098 vaccination operations in Bengal during 1907-08, results from an increase of 27,784 revaccinations and a decrease of 6,686 primary cases. Nineteen districts show an increase. As a whole the work of the department was generally satisfactory and would have been better but for the prevalence of scarcity which was to some extent the cause of the smaller amount of work in the majority of the fifteen districts which show a fall. The percentage of success in both classes of work was better than in 1906-07. The arm-to-arm process of vaccination has been discontinued in the Presidency, Burdwan and Orissa Divisions; the proposal to establish a vaccine depot at Ranchi to serve the Bihar and Chota Nagpur districts and ultimately supplant arm-to-arm vaccination, has been deferred in view of the proposed introduction of a new and expeditious method of vaccine preparation. Experiments conducted during the year point to the superiority of glycerine over lanoline vaccine.

United Provinces.

There was an increase of 27,079 vaccination operations in the United Provinces during 1907-08 compared with 1906-07, and while the percentage of success in primary cases, 97·85, showed a slight increase, the rate in revaccinations, 83·92, showed a slight fall. Twenty-nine districts shew an increase and twenty a decrease, among the causes in the latter being the mistrust and fear of plague inoculation, the transfer of vaccinators and sickness among the people. The Bovine lymph depot at Patwa Dangar (Naini Tal district) has done excellent work since its inauguration; the income has increased and the expenditure fallen. The price charged per tube of vaccine for quantities of 24 tubes and less is estimated to be one-sixth the price charged in Great Britain. It is hoped shortly to be possible to discontinue arm-to-arm vaccination throughout the province.

Punjab.

Although the number of primary vaccinations in the Punjab during 1907-08 were 25,454 fewer than the year before, the revaccinations numbered 27,918 more. The decrease in the primary cases is attributed to the fewer births. The percentage of success was not as good as in the year 1906-07, falling from 99·34 to 99·03 in primary cases and from 78·12 to 75·91 in revaccination. In towns where the Vaccination Act is in force, 77 per cent. of the available children were successfully vaccinated and 62 per cent in the others. The extension of the Act to towns where it does not apply has been recommended. Chloroformed glycerine vaccine continued to be issued from the Punjab vaccine institute: to check waste by demands in excess of requirements, supplies are to be issued on payment in future. The rebuilding of the institute at Lahore awaits the allotment of funds.

North-West Frontier Province.

For the second year in succession the total number of vaccination operations in the North-West Frontier Province showed a fall, though in 1907-08 of 1,038 cases only. The number of primary cases were 255 fewer, but the percentage of success, 99·22, was higher than in 1906-07. The falling off was most marked in the Hazara district, due to illness among and the transfer of vaccinators and also to the water poisoning scare in April, May and June 1907. Chloroformed glycerine vaccine, obtained from the Punjab institute, was used in more than double the number of cases for which fresh animal lymph was employed. The use of the former makes vaccination more popular, one reason being that children and buffalo-calves as vaccinifers are the less necessary.

Central Provinces.

The prevalence of plague in many parts of the Central Provinces, and the dislocation of work caused by necessary transfers among the staff, impeded vaccination work, with the result that the number of primary cases and revaccinations were fewer by 1,378 and 16,756, respectively, during 1907-08: revaccinations were also affected by scarcity conditions in every district. While the percentage of success in primary cases,

98·41, was practically the same as in 1906-07, that in revaccinations, rose from 75·38 to 76·36, a result which is considered doubtful and is probably due to the falsification of returns by vaccinators. In the fifty towns in which the Vaccination Act is in force, 91·88 per cent. of the children were successfully vaccinated. Glycerinated calf vaccine is exclusively used in all except three districts, but is not so successful as fresh calf lymph or the arm-to-arm process: this is due to the absence of facilities for civil surgeons to prepare the vaccine required, a defect which is being remedied.

Bombay. Although there was an increase of 7,653 vaccination operations in the Bombay Presidency during 1907-08, very little of the ground lost during the two preceding years has so far been made good. The quality of the work done during the year, except for revaccinations at dispensaries, shows an improvement on the results of the previous year. The number of children vaccinated in towns exceeded the number calculated to be available: this is due to children being brought from outside to be operated upon. Glycerinated vaccine was brought into general use with fairly good results. In two registration districts no animal lymph was used, and in the others calf to arm vaccination was in force on a small scale only. The buildings for the vaccine depot at Belgaum were in course of construction. No inoculation was known to have been practised and opposition to vaccination was reported to exist in the Gujarat and Sind registration districts only.

Madras. The increase in the total number of vaccination operations in the Madras Presidency in 1906-07, was further added to by an increase of 76,248 cases in 1907-08. The prevalence of small-pox and instructions to vaccinate unprotected persons explain the increases where they occurred, while the decreases in certain districts were attributed to local causes. The percentage of success in both primary cases and revaccinations, 95·61 and 76·60, respectively, were above the rates returned in 1906-07. The amount of work done at dispensaries continues to fall as a consequence of the orders of the Madras Government removing the responsibility of vaccination from medical officers. In municipalities 67·3 per cent of the children were successfully vaccinated. The vast majority of the operations were carried out with lanoline vaccine.

VI.—MEDICAL INSTITUTIONS.

A.—Civil Hospitals and Dispensaries. (State, Public, Local Fund and Private-aided.)

Taken together, the hospitals and dispensaries in this class number 2,542 and provided treatment for 24,987,392 patients, as detailed in the statement below. It will be observed that the increase in numbers of in-patients and out-patients continues to be well maintained; and, as compared with the year 1905, 28,793 more in-patients and 1,521,126 more out-patients presented themselves for treatment—Year by year more dispensaries are instituted, but more are required than can be immediately supplied. The great bulk of the income of these dispensaries is derived from Government, local and municipal funds; and the total expenditure in 1907 was Rs. 101,93,666, or £679,578, an increase over last year's expenditure of over £45,000. Subscriptions from natives form a small proportion of the whole income, and in most provinces appear to get less every year. Improvements in accommodation are everywhere resulting in more well-to-do patients taking advantage of hospital treatment. There is also a marked increase in the numbers of women and female children attending these hospitals.

The following comparative statement shows the number of hospitals and dispensaries of this class in the several provinces during 1906 and 1907, the number of in- and out-patients treated, and of operations performed.

It will be observed that, for the first time, information is given regarding the Rajputana and Central India Agencies, Baluchistan, Gilgit and Tibet. The figures of totals for the two years are not therefore exactly comparable.

		Number of Institutions.	Number of In-patients.	Number of Out-patients.	Total number of patients.	Number of operations.
1. Eastern Bengal and Assam	1906	336	24,575	3,000,318	3,024,893	74,136
	1907	338	24,455	3,034,894	3,059,349	75,594
2. Bengal (*a*)	1906	319	36,435	2,520,889	2,557,324	117,312
	1907	328	38,397	2,694,383	2,732,780	122,688
3. Calcutta and Howrah	1906	15	25,012	265,480	290,492	29,550
	1907	15	25,689	280,010	306,299	31,383
4. United Provinces	1906	349	59,334	3,903,319	3,962,653	188,572
	1907	355	64,597	3,875,006	3,939,603	193,824
5. Punjab	1906	277	62,826	3,707,582	3,770,408	192,643
	1907	282	65,584	3,717,389	3,782,973	189,451
6. North-West Frontier Province	1906	37	8,888	575,744	584,632	23,082
	1907	41	10,097	565,639	575,736	25,336
7. Central Provinces and Berar	1906	156	12,336	1,660,370	1,672,706	41,044
	1907	162	12,431	1,688,056	1,700,487	41,792
8. Coorg	1906	7	1,031	48,030	49,061	803
	1907	7	1,293	51,227	52,520	828
9. Burma	1906	148	49,248	967,072	1,016,320	25,893
	1907	161	45,548	997,812	1,043,360	27,106
10. Madras	1906	483	68,348	5,187,601	5,255,949	175,076
	1907	485	69,224	5,173,604	5,242,828	184,238
11. Bombay	1906	309	51,193	2,244,121	2,295,714	82,332
	1907	312	50,460	2,133,419	2,183,879	81,723
12. Rajputana Agencies (*b*)	1907	19	1,075	81,672	82,746	3,843
13. Baluchistan	1907	21	3,063	188,936	192,890	4,227
14. Central India Agencies	1907	6	1,202	48,923	50,125	9,251
15. Gilgit Agency	1907	9	759	43,609	44,368	1,018
16. Tibet (Gartok)	1907	1	7	393	400	15
Total	1907	2,542	413,821	24,573,571	24,987,392	992,317
	1906	2,436	399,626	24,080,526	24,480,152	951,603

(*a*) Excluding Calcutta and Howrah.
(*b*) Including Ajmere.

There has been an increase in the number of out-patients, and a most satisfactory feature is the larger number of female children brought for treatment. At Mymensingh female dispensary work has however practically ceased in the absence of a lady doctor, and the number of patients fell from 3,185 to 24. The marked variations in the figures of attendances from year to year in some institutions depend on a variety of causes, among others to faulty location; their removal to more populous centres often has most beneficial results. The system, in certain districts, of offering treatment to all-comers at the weekly markets is very successful. The proportion of the population that received medical relief in some form rose from 9·63 to 9·93 per cent, and more operations were performed. The percentage of deaths after operation fell from 0·16 to 0·13.

Eastern Bengal and Assam.

Hospital assistants are now being sent for "refresher" courses to the medical schools, and are also periodically stationed at head-quarters of districts. It is hoped that in this way their knowledge will be kept up to date. Compounders will in future be taught bandaging, dressing and minor surgery, and will be more useful in dispensaries than they have been hitherto.

Funds are lacking for many much needed improvements; the Inspector-General draws attention to the small support that is given by the well-to-do classes to the dispensaries and medical institutions in these provinces.

Bengal. Nine new dispensaries have been opened, but even now the total number is not sufficient. Much necessarily depends on local effort, and the co-operation of the wealthier classes which is not always forthcoming. Good results have followed the system of deputing medical subordinates in charge of dispensaries to outlying market centres, where they treat large numbers of out-patients on market days. The record of attendance indicates the growing popularity of the dispensaries; but it is noted that only 12·77 per cent. of the patients paid for their own food when in hospital, a lower proportion than usual. The percentage of the total population seeking relief has risen to 8·82, whereas in 1905 it was only 7·95. The number of female patients is very much greater than formerly, *viz.*, 905,801 as compared with 736,663 in 1904. This is most satisfactory and is due to separate accommodation for women having been provided in many of the dispensaries. During the fever season it is intended that, in future, hospital assistants shall be sent to travel through affected districts and give medical aid. The number of special pauper wards has been increased; and it is believed that the separation of paupers from the well-to-do classes will induce the latter to seek indoor treatment more freely than heretofore.

Calcutta and Howrah. The figures show that the popularity of the Calcutta Institutions is well maintained. The number of female patients has risen from 48,981 in 1897 to 63,106; the increase is largely due to the arrangements that have been made for separate treatment of women in all the hospitals. Not only do large numbers of patients come in from outside for treatment, but an increasing proportion of these is prepared to contribute to the hospital funds. Thus the income from paying patients has risen from £5,960 in 1905 to £6,821. Government expended over £86,500 on the hospitals in 1907, but the Calcutta Corporation contribution is still not more than 3 to 4 per cent. of the whole. The task of improving accommodation, reconstructing existing buildings, and modernising equipment is being carried on assiduously; and the hospitals are now very greatly improved in all these respects. The improvements at the Medical College Hospital alone have cost over £ 43,000 during the past three years.

The question of nursing is regarded as one of the main difficulties to be dealt with, and is far from a satisfactory solution. The demand for certificated nurses in India is so great that the majority of the nursing staff consists of probationers, and their standard of training is not as high as it should be. There is, moreover, a good deal of discontent among them in regard to their pay, dieting, etc.

The number of operations performed again shows an increase; the mortality after operation was only ·88 per cent.

United Provinces of Agra and Oudh. The number of general dispensaries in the provinces rose from 349 to 355, and there was a considerable increase in the number of in-patients. Attendance at female dispensaries is more popular than it was, and there were 357,898 women treated as compared with 332,609 in 1905. The slight decline in numbers of out-patients is ascribed to diminished incidence of malarial fever. The number of operations performed has also risen, and these are more successful each year as a result of steady improvement in the supply of instruments and operating rooms. Over £33,000 were expended on buildings, and large works are contemplated at Bareilly, Etawah, Aligarh and Mainpuri where funds are available. In the past three years nearly every operating room in the Provinces has been rebuilt or remodelled. The shortage of civil hospital assistants continues; the rates of pay are quite inadequate, and there is not enough accommodation for students at the Agra School. The question of pay is under consideration still, and will, it is hoped, shortly be settled.

The training of *dhais* or midwives on modern principles is being carried on, and there is a growing demand for the services of these women, and also of female compounders.

The continued presence of plague and famine and the measures taken to combat them were a severe tax on the resources of the medical department. The services of eight Indian Medical Service officers and 80 subordinates were obtained from other

provinces and from the Army, and several retired hospital assistants and private practitioners were employed. Over 34,000 anti-plague inoculations were performed.

The new Medical College at Lucknow is under construction.

Punjab. The number of State, Local Fund and State-aided institutions has risen from 277 to 282, but there is still urgent need for more throughout the Province. In spite of somewhat improved climatic conditions, more patients came for treatment, and this is especially marked in the case of women. Thus in 1905 there were 659,927 female out-patients, whereas last year there were 799,046, and it is evident that improvement in accommodation for females has had good results. The Inspector-General comments on the fact that even the well-to-do classes resort freely to dispensaries, and by so doing offer no encouragement to the private practitioner. At the same time the Indian subscriptions only amounted to £1,621, while the total expenditure was close on £71,666. In spite of scholarships offered to women students their number under training at the Medical College continues very small; only one woman entered the special department for a University degree or diploma. Great efforts have been made to train women as midwives, and classes have been formed at eight stations, but, so far, very few *dhais* have come forward for instruction.

The professional knowledge of hospital assistants is being improved as far as possible by attaching them periodically to head quarters hospitals, and supplying them with medical literature. Many of these men have done admirable surgical work during the year.

There was a slight decline in the number of surgical operations, which is ascribed to the prevalence of plague; but in some classes of operation, notably in those for removal of stone, there is a steady increase.

Great attention is being paid to the improvement of hospital buildings and equipment.

Central Provinces and Berar. Although there is a slight rise in the number of in-patients and out-patients the daily attendance has fallen. This is ascribed to the prevalence of plague, the consequent exodus of the people, and the temporary distrust of Government institutions which springs up in plague times. This avoidance of hospitals is said to be more marked in the case of women than of men. In spite of this, there is evidence that dispensary treatment is becoming more popular among women. An increase has been made in the pay of compounders and menial staff. Improvements have been carried out in some of the larger hospitals; the financial condition of many of the smaller dispensaries is, however, unsatisfactory, preventing the execution of much needed repairs and revision of equipment. There was an increase in the number of local fund and private-aided dispensaries by six, and more will be added when arrangements can be made for the necessary personnel.

North-West Frontier Province. The decline in the number of out-patients as compared with 1906 is ascribed partly to the greater unhealthiness of that year and partly to mischievous stories spread by malcontents when plague appeared in the Province. There has been an addition of four aided dispensaries to the total, and several new local fund institutions will probably be opened as funds permit. The number of patients from across the border who come in for treatment continues to increase; and, when the hospitals in outlying places are improved, their usefulness will be further enhanced. There was a remarkable falling off in the number of children brought for treatment; this is ascribed partly to abnormally heavy mortality among them during the unhealthy year 1906, and partly to the marked decline in the birth rate during that year.

Bombay. There was a decline in the number of in-patients and out-patients, notably in the latter, and also in operations performed of which no explanation is offered. The number of State, public, local fund and private-aided dispensaries was larger by three than in the year 1906. The ratio of female patients to the total continues to increase, and now amounts to 28·2 per cent; in 1906 the corresponding figure was 24. Expenditure on hospitals rose by more than £5,000, the increase being mainly due to building and repairs; over £6,600 was devoted to the improvements of existing hospitals.

Madras. There is room for more dispensaries. Including all classes there is now one institution for every 62,621 inhabitants, whereas in 1904 there was one to 61,611. In the special women's hospitals there continues to be a steady increase in the number of patients. The number of operations performed shows a remarkable increase, removal of the lens for cataract alone showing a rise from 1,152 cases in 1905 to 1,471 in 1907. Improvements have been carried out both in hospitals in Madras itself and in the district dispensaries. Subscriptions to medical institutions from the general population

are still very small; in the year under review the sum so obtained from natives fell to £832. The training of maternity nurses is being carried out as far as accommodation permits; native midwives continue in great demand. The Surgeon-General considers that the improvement of the hospital assistant, as regards his education, social position and prospects requires very early attention.

Coorg. The new hospital at Mercara is open and additions are being made to the staff.

Burma. The number of dispensaries (State, public, local fund and aided) rose from 148 to 161, but more are required, and many existing ones will have to be reconstructed. Much has been done in this direction, and operation rooms are being built as funds permit. The new General Hospital, Rangoon, and the hospital at Maymyo are still under construction. The increase in numbers of female patients, both as in-patients and out-patients, is marked, and is ascribed to the special accommodation and attendance supplied for them. The general increase in attendance has been due to more Hindus and Mahomedans coming for treatment, whereas the number of Burman patients shows a steady annual decline. Even in Rangoon, where certain wards are reserved for them, there has been a marked falling off in the number of Burmans. This is ascribed to plague scares, but it is not apparent why the Burmans should be affected thereby so much more than Hindus and Mahomedans living in the country.

A complete scheme for provincial laboratories is under consideration. Special surgical equipment has been issued to many of the larger dispensaries.

There is a shortage of civil hospital assistants, who, as a class, are very dissatisfied with their conditions of service; and recruitment becomes increasingly difficult. A medical school for training Burmans, Karens and others was opened during the year, but has not been very successful; so far the students are not sufficiently well educated to follow their teachers, and the stipends offered by Government have not proved attractive enough. The Inspector-General considers that, so long as good class Burmans are not obtainable for the subordinate medical service, the progress of medicine among the general population will be slow.

Baluchistan. The number of State, public and private-aided institutions remains the same, *viz.*, 21. A new dispensary will shortly be opened at Kej in Mekran, and three more are under construction. There was a decrease in the numbers treated, partly due to malarial fever being less prevalent, and partly to withdrawal of workmen on the Quetta-Nushki line. Additions and improvements were made to existing hospitals. No local men were employed on the medical staff, as none possessing the necessary qualifications were available.

Central India Agencies. There are only 10 State, local fund or state-aided dispensaries in Central India, but there are now 187 belonging to the various Native States. The people are resorting freely to these institutions, and many more would seek relief in the smaller states if funds were available for the supply of hospitals and staff. A qualified hospital assistant and a hospital represent an annual outlay of £ 66 and this is often quite beyond the financial powers of the states to provide.

Tibet (Gartok). A dispensary, in charge of a hospital assistant, has been established at Gartok. The population is very sparse, but patients are coming in, and when its existence is better known in the country it will probably become very popular.

B.—Civil Hospitals and Dispensaries—State Special, Railway and Private non-aided.

In addition to the State, public, local fund and private-aided institutions there are 433 State Special, to meet the requirements of Police, Surveys, Canals, Forests, etc., 339 Railway hospitals and 701 non-aided private hospitals. Taken together these number 1,472, or 18 fewer than last year.

The annexed statement tabulates the principal items of information regarding them:—

Institutions.	Number of Institutions.	In-patients.	Out-patients.	Total.	Operations performed.
State Special and Railway ...	772	89,983	1,577,458	1,667,441	32,965
Private non-aided ...	701	39,895	4,435,882	4,475,777	109,229
1907 ...	1,472	129,888	6,013,340	6,143,228	142,194
1906 ...	1,490	137,936	5,746,244	5,884,180	...

As indicated by their names, the State Special and Railway hospitals are maintained for special classes of the community, and are financed accordingly. It is not possible to obtain figures of the income and expenditure of the private non-aided institutions.

C.—Lunatic Asylums.

The following table shows the strength of the Asylum population in 1907 and the statistics of sickness and mortality :—

Administration.	Admitted and readmitted during 1907.	Total Asylum Population.			Discharged cured.	Died.	Daily average strength.	Daily average sick.	Number of Criminal Lunatics.
		Male.	Female.	Total.					
Bengal	196	830	217	1,047	69	76	849 29	90·56	502
Eastern Bengal and Assam	104	487	89	576	36	27	475·91	32·25	284
United Provinces	295	1,142	339	1,481	148	110	1204·72	99·93	293
Punjab	191	622	168	790	51	107	608 13	48 25	149
Burma	249	648	94	742	35	47	342·10	23·05	466
Central Provinces	101	278	118	396	28	26	317·15	8·19	90
Bombay	361	1,028	279	1,307	140	67	955·5	24·2	179
Madras	180	595	222	817	66	103	631·88	56·69	136
Total ... 1907	1,687	5,630	1,526	7,156	571	583	5,384·68	383·12	2,039
Total ... 1906	1,718	5,586	1,445	7,031	569	496	5,409·79	368·35	2,043

The figures for the whole of the 23 asylums as compared with those of 1907, show unimportant fluctuation, except as regards the number of deaths. The increase in mortality is explained below.

The substitution of large central asylums constructed on modern lines is being recognised as a necessity. It will result no doubt in a reduction in the amount of disease and mortality, besides being more economical and satisfactory from the administrative point of view.

The high proportion of criminal lunatics to the whole asylum population is remarkable.

Bengal. There has been temporary overcrowding at the Bhawanipur asylum only. Many sanitary improvements were carried out at Berhampur, and there has been a marked improvement in the health there. At Patna the water-supply has required attention. Isolation blocks for tuberculous cases are being provided in the three asylums. The cost of these institutions amounted to £10,667 of which only about £1,000 is contributed by paying patients. The scheme for a central lunatic asylum at Ranchi is still under consideration.

The very high proportion of criminal lunatics, 502 out of 1,047 inmates, is not explained. It is very much greater than in other parts of the country.

Madras. The average daily sick shows a slight increase, and the mortality was 16·3 per cent against 11·87 last year. This was partly due to an outbreak of cholera in Madras, which accounted for 14 deaths.

No important works have been carried out during the year, and there was no overcrowding.

Punjab. The daily average sick showed a decrease on the figure for 1906, but 107 cases died as against 57 last year, and the death-rate was 17·59 per cent as against 9·43 per cent of strength. This is ascribed in part to an outbreak of cholera in November which caused 26 deaths, and partly to the prevalence of pneumonia. The cholera epidemic is said not to have been caused by the general drinking water-supply of the asylum, but by contamination of the water introduced for flushing, gardens, etc. It was found that inmates frequently drank from this objectionable source. There was overcrowding in the male portion of the asylum, and resort had to be made to tents and huts; a new hospital and additional cubicles are, however, under construction, and this difficulty will then be overcome. The capacity of the asylum at present is 468 males and 162 females or 630 in all and the average daily strength was 605. The percentage of recoveries fell from 11·24 in 1906 to 8·39. Only 134 lunatics were employed in the factory. The pay of assistant matrons has been increased, and the local Government has sanctioned a considerable increase in the permanent establishment of the asylum, with high rates of pay. It is hoped this will result in a better class of keeper being obtained.

Burma. In spite of the temporary establishment of a branch asylum at Minbu, with accommodation for 80 inmates, there was overcrowding throughout the year in the Rangoon asylum. The daily average number of lunatics under treatment has risen steadily for

some years past, and is now 542 as compared with 475 in 1906; and as the total accommodation is for 509 patients only there is urgent need of a new asylum. The general health showed an improvement. The water-supply of the Rangoon asylum is now efficiently filtered. The old wooden latrines have been replaced by iron ones. There were two cases of attempted suicide; as a result, the "card system" of surveillance has been introduced, and has been found to work well.

Bombay. The increase in the asylum population continues, and the accommodation in some of the asylums is inadequate; this is, however, largely due to the large number of criminal lunatics, who will be sent to Yeraoda when the new central asylum there is completed. The water-supply at Colaba and Ratnagiri was deficient, but steps are being taken to improve matters. The general health was satisfactory.

United Provinces. There was a decline in admissions. The high death-rate at Agra in 1906 has not been repeated, but there was an epidemic of influenza there with 19 deaths. The flushing system of conservancy at Benares has been given up and the dry earth system reintroduced; the health of the inmates showed an immediate improvement which has been maintained. There was no overcrowding.

Eastern Bengal and Assam. The new tuberculosis ward at Dacca has reduced the overcrowding to some extent; at Tezpur, however, there was considerable overcrowding, and a new barrack is being built to remedy this. The mortality was higher than last year.

Central Provinces. All female insanes have now been transferred to the asylum at Nagpur; and it is intended to close the Jabalpur asylum altogether when the building operations at Nagpur are completed. The health of the inmates was good throughout the year.

D.—Medical Colleges and Schools.

Bengal. There are the Calcutta Medical College and the Campbell, Temple and Cuttack schools. There are also some institutions unaided by Government.

Building operations were in progress, or sanctioned, at the Medical College. These consist of a large theatre, an anatomical museum and some offices. The provision of a new hostel for civil students is being considered. The number of male students remained as in 1906, but applications for entry were more numerous. There were 14 female students. The military assistant surgeon class numbered 64.

The classes in histology, practical physiology and physiological chemistry were well attended. A separate chair of biology was established, and it is proposed to have a whole-time professor of Anatomy.

A proposal to establish a school of dentistry is under consideration.

The Campbell School is being further improved, *viz.*, a new dissecting room and theatre, carried out which will make it a model institution. A hostel is contemplated. A new barrack for students has been built at the Temple School, and a new hostel at Cuttack is under consideration. The average daily attendance at these schools, which fell off for two years on account of the raising of the standard of preliminary education, shows signs of improvement. The decline in attendance is most marked among Bihari and Uriya students—18 students passed into Government service and became civil hospital assistants; but as 76 male and 4 female students passed the final examination, it is evident that private practice offers more inducements.

Madras. *Madras Medical College.*—New hygiene and physiological laboratories are being constructed at a cost of over £ 10,000; and others for pathology and materia medica are contemplated. The question of a hostel is still under consideration.

The chemist and druggist department fails to attract students of a good stamp; its retention for another three years has been sanctioned. The *post* graduate course for civil hospital assistants continues to be a success.

There is a proposal to appoint a whole-time Professor of Pathology.

Vizagapatam.—A new school building is under construction. The number of students shows a decline from 44 to 37.

Tanjore. Prince of Wales' Medical School.—There are now 42 students; of these 25 are in the civil and 10 in the military hospital assistant class. The question of the abolition of the school is under consideration.

Royapuram.—The number of students continues to fall; in 1903 it was 196, it is now 141. Clinical material is insufficient for proper instruction. Six students passed the final examination for civil and six for military hospital assistant.

Grant Medical College.—Temporary laboratories for bacteriology and biology classes have been supplied; the works in connection with the new pathological laboratory and operation theatre are progressing rapidly, and for two other theatres have been commenced. Additions are also being made to the ophthalmic department of the hospital, and a new out-patient department is proposed. The new hostel, to accommodate 240 students, is under construction. A minor chair in physics and three tutorships in physics and bacteriology have been sanctioned, and the pay of certain other tutorships increased. Bombay.

The number of students at the commencement of the year was 638, and 528 remained at the end of the year; there were 41 military medical pupils. Out of 233 candidates, 71 passed the final L.M.S. examination. There were 35 female students.

Poona Medical School.—There were 120 students, of whom 44 are military and 41 civil medical pupils; 28 students passed out as hospital assistants. The accommodation is being improved.

Ahmedabad Medical School.—There were 138 students, 56 of whom were military and 19 civil pupils. A hostel is being built.

Hyderabad Medical School.—There were 45 students on the rolls. There are not enough teachers to cope with the new curriculum. The number of candidates for admission has steadily declined for some years owing to the unpopularity of the hospital assistant service. The proposed addition of a maternity ward to the civil hospital will afford much needed opportunity for practical training in midwifery.

Lahore Medical College and School.—There has been a decrease in the number of college students from 257 to 236 due to the higher standard of preliminary education demanded. There is also a decrease in the number of school students due to an attempt to boycott the military hospital assistant service. Only six military pupils could be recruited for 50 vacancies, and the result was that a class of ward orderlies had to be trained instead. As these men do not know English, their teaching has to be conducted in Urdu, and this is regarded as a retrograde step. In the college 23 students appeared for the M. B or L. M. S. examinations and 13 passed, and in the school 94 went up for the qualifying examination and 83 were successful. Punjab.

The questions of extra staff for teaching purposes, the separation of the School from the College, and the transfer of the former to Amritsar, and the necessity for additional land for new buildings, are under consideration. Preliminary science teaching in chemistry, botany, zoolgy and physics has been transferred entirely to the college.

The question of renting houses to serve as temporary hostels is under consideration.

Agra Medical School.—There was a slight increase in the number of students, the total being 329; of these 68 are women. A new hostel for female students is under construction. United Provinces of Agra and Oudh.

The increase of staff and addition of accommodation have greatly improved the school, which is now in a very efficient state.

Lucknow Medical College.—Under construction.

Government Medical School, Rangoon.—This was opened during the year, with ten students, nine of whom were in receipt of stipends. Most of them are Burmans; and it is hoped that the school will provide civil hospital assistants for the province. At present the defective knowledge of English of most of the students renders instruction difficult. Increase of the stipends is proposed with the object of attracting a better class of students. The staff will be inadequate as the numbers increase. Burma.

Dacca Medical School.—An examination hall and laboratory, a new *post mortem* theatre and a gymnasium are to be built, and land has been acquired for two hostels. The students numbered 210, of whom eight were females. The compounder class is numerous and popular; and a *dhai* class has been instituted for native midwives. Eastern Bengal and Assam.

Berry White School, Dibrugarh.—A military pupil class was opened at this school as an experimental measure, and ten students joined it. The new rules regarding the preliminary standard of education have resulted in a decline in the number of admissions to the school; there are now 115 students.

In addition to the Government schools there are two others which may be noticed.

Hyderabad Medical School.—The total number of students is 65, of whom 16 are in the assistant surgeon class and the remainder in the hospital assistant class. The instruction is given entirely in English. Hyderabad (Deccan).

Central India.

Indore Medical School.—This is supported by voluntary contributions from the Native States, and supplies hospital assistants for the latter, and also for some of the agency hospitals. Instruction is given by the Residency Surgeon and the staff of the Charitable Hospital, Indore Residency; ample clinical material is available in this institution. A bacteriological laboratory is attached to the school in which good work has been done.

E.—X-Ray Institute of India, Dehra-Dun.

During 1907 two classes were held, of two months for civil students and of three months for military students. Thirty-four students passed, seventeen obtaining "proficiency." The students included medical officers of both services, R.A.M.C. and I.M.S., assistant surgeons (European and Native) and hospital assistants (Native). The scope of the practical course was considerably increased as it was found that native students especially were somewhat backward in this direction. They were required to shew a practical knowledge of every piece of apparatus used, and to themselves make some simple piece of apparatus. This part of the work has now become very popular with all classes of students.

The number of skiagraphic examinations made was 1,188, the electrolytic interrupter and direct running from the main being usually employed. The issue of sets of apparatus to military Divisions (one set per Division) was made at the end of the year. Previous to this all military cases were sent to the Institute for skiagraphic examination. A few cases of "frontier sore" have been under treatment during the year, all of which have healed rapidly. No case of X-ray traumatism has occurred amongst the patients, staff or students of the Institute.

Research Institutes.

Accounts of the Central Research Institute at Kasauli, the Bombay Bacteriological Laboratory, the King Institute, Madras, and the Pasteur Institutes will be found at pages 132 to 134 of this report.

VII—SANITATION.

Burma.

During the year 1906-07, municipalities in Burma spent 44·57 per cent. of their income on sanitary works, of which 4·98 per cent only was on water-supply, a fact which affords the provincial Sanitary Commissioner grounds for misgiving in view of the annual recurrence of water-borne diseases. At Rangoon the improvement and extension of the Shone and Ault system of sewerage was in progress, and at Henzada the conservancy scheme was introduced. The improved conservancy scheme for Mandalay was temporarily suspended for want of funds. The Akyab gravitation water-supply scheme was in progress and the Mandalay scheme has now reached a stage at which choice lies between two of the four projects considered by the Sanitary Board: the decision rests with the local Government. Model sanitary works are to be erected close to the market at Insein, to serve as object lessons to medical and municipal officers.

The Sanitary Board held two meetings during the year.

Eastern Bengal and Assam.

The forty-four municipalities in Eastern Bengal and Assam spent 41·98 per cent of their income on sanitary works during 1906-07: the sums spent on water-supply, conservancy and roads was greater than in the previous year, while under the general head "other sanitary works" the expenditure was nearly four times as great. In several municipalities specific sanitary schemes are either in progress or are contemplated, but progress is slow owing chiefly to the lack of funds. The newly appointed Sanitary Engineer will, it is said, be of great assistance in preparing and supervising sanitary projects.

The Sanitary Board held only one regular meeting during the year, but a good deal of work was done by correspondence in connection with water-supply and drainage schemes. A sum of £2,032 was distributed to District and Local Boards as the one-third share of cost granted by Government for improving water-supplies in rural areas, but progress is nevertheless slow. The Board had under consideration reports by the Deputy Sanitary Commissioner on the unhealthy tracts of the Faridpur, Rangpur and Rajshahi districts, and on the water-supply of Kamrup. Special grants to improve the sanitary conditions in those areas will probably be required.

Bengal.

Of their total income the 128 municipalities in Bengal spent 43·15 on sanitary works (original and recurring) during the year 1906-07. There were satisfactory increases under the important heads of expenditure and the large sum of £23,109, or £12,438 more than in the preceding year, spent on drainage is accounted for by the construction of drains in Howrah. All the important towns are busy preparing comprehensive drainage schemes, but in two—Suri and Bihar—progress is retarded for want of funds. The improvement of water-supplies by excavating new wells and tanks and repairing existing ones received attention. The steady rise in the expenditure on conservancy, on which £83,017 was spent in 1906-07, shows that due attention is paid to the matter, but it is urged that no material benefit is likely to accrue unless a suitable staff is employed to keep the system in order. The appointment of an officer to inspect septic tank latrines at the various mills has been proposed.

The Sanitary Board held two meetings during the year. Among the principal subjects of discussion were the Puri and Chapra drainage schemes, and the supervision of the preparation of municipal drainage schemes in the Presidency Division: the Board conducted a good deal of consultation work by the circulation of papers.

Calcutta City.

Progress in the work of improving *bustees*, begun four years ago, was well maintained during 1907-08, more than a mile of new roads being opened and one and a half miles of underground sewers laid. Further progress was made with the Suburban drainage scheme. The sewerage system west of Tolly's Nullah remains in abeyance pending the construction of a syphon across the Nullah: a definite offer to construct the syphon has been received and it is hoped this very necessary work will soon be completed. The Belliaghatta drainage scheme has been completed and is in operation. The most important drainage scheme planned of recent years, next to the Suburban scheme, is the project for the sewerage of the fringe area. The scheme has been sanctioned and work on it will commence shortly. The drainage of the *maidan* is making good progress. The scheme to drain a portion of Garden Reach by a sewer discharging into the Hugli river, is regarded as a very useful one: delay was caused by a question of the necessity for a pump to discharge the drainage during high tides, but as it has now been decided to instal a pump, the work is to be commenced. The scheme for the improvement of the Calcutta water-supply has been sanctioned: this involves an elevated reservoir, a large trunk main and additional pumping machinery.

It is hoped the work will be completed by the end of 1911. Further progress was made with the extension of the continuous water-supply, which, it is expected, will be completed by the prescribed date, *viz.*, 31st March 1909. An analysis of the capital expenditure on the water-supply of Calcutta from the beginning, shows that there has been a total outlay of over £1,286,000 on filtered water and of £300,000 on unfiltered water.

United Provinces. Progress in sanitation in the United Provinces continues, and during 1906-07 the Sanitary Board dealt with projects and estimates amounting to £292,687, which is the largest sum dealt with in any year. Municipalities spent an average of 50 per cent of their income on sanitary works. The expenditure on water-supply was £64,740 against £43,485 in the previous year, but this increase was partly adjusted by the reduction in the expenditure on drainage to £57,199 from £73,147. Municipalities have been relieved of all police charges and direct expenditure on plague, loans are liberally granted and special grants made where most needed, so that funds are now available for sanitary works. The water-works at the large towns worked satisfactorily throughout the year: the consumption of water is said to be increasing. The Mussoorie hydro-electric scheme was under construction, a sum of £30,000 being spent on the work during the year.

The Sanitary Board held seven meetings and dealt with projects and estimates amounting to the largest sum ever dealt with. The Board resolved that no standard scale of cost for drainage projects in towns was possible as the circumstances of towns vary greatly.

Punjab. Out of an income of £391,435, municipalities in the Punjab spent £188,372 during 1906-07 on works of public health and convenience: large sums were spent on conservancy (£42,815), drainage (£28,691), and water-supply (£30,973). The construction of and improvements to water-works and drainage systems in various places were in hand. No improvement was recorded in the maintenance of completed drainage works, and the view is held that unless efforts are made to reorganize scavenging and flushing establishments, the drainage schemes will be of doubtful benefit. Of sanitation generally it is said that substantial progress is not possible till it is recognized that the smaller municipalities cannot afford to construct water-supply and drainage works and a liberal sum for the purpose must be provided from provincial revenues. The income from sullage disposal was satisfactory.

The Sanitary Board held four meetings during the year. Of the sum of £2,000 allotted for grants-in-aid to municipalities, £1,280 was withdrawn owing to the unfavourable agricultural conditions prevailing in the province.

North-West Frontier Province. No important sanitary work was undertaken in the North-West Frontier Province. The repair of drains, improving drainage and sewerage, and improvements to water-supplies engaged attention. The Abbottabad municipality spent more than half its income on sanitary charges.

Central Provinces. The district head-quarter municipalities in the Central Provinces spent 42·72 per cent of their income on sanitary works, (original and recurring) showing an increase under all heads except vaccination on which the expenditure was the same as in 1905-06. The important project to improve and extend the Jubbulpore water-supply, at an estimated cost of £21,550, was taken in hand and good progress made during the year. In most districts minor works connected with water-supply, drainage, etc., were carried out.

The Sanitary Board held meetings at the head-quarters of all but four districts. The reconstitution of the Board on more practical lines is under consideration. No officer was available for appointment as Sanitary Engineer, and it was suggested that pending such an appointment, arrangements might be possible to have projects drawn up by an expert and criticised and passed by an experienced Sanitary Engineer.

Bombay Presidency. The 161 Municipalities and 236 District and Taluka Local Boards in the Bombay Presidency spent 27·3 and 4·8 per cent. of their respective incomes on water-supply, drainage and conservancy. Although the income was greater than in 1905-06 in both cases, the expenditure on sanitary works was lower. Considerable progress was made in the extension of the Shone system of drainage at Karachi, and the Pandharpur drainage scheme was put in hand. Among the several sanitary projects which received attention, are included the Dharwar water-supply scheme and the improvement of the water-supplies of Hubli, Ahmednagar, Hyderabad (Sind) and Pandharpur: the last named is a specially important work on account of the large number of pilgrims who visit the town. The local Government announced the grant of liberal aid to Municipalities and Local Boards for the execution of sanitary works.

The Sanitary Board held two meetings during the year and among other matters, considered the question of the establishment required for the preparation of projects or estimates for sanitary works for municipalities.

Bombay City. Good progress was made with the Malabar Hill Sectional sewerage works and action was taken to have properties in the sewered area connected with the new sewers. Storm-water drains were laid in certain places and the work of laying them in others was vigorously pushed forward. The diversion of sewers and storm-water drains necessitated by the proposed Port Trust Railway and overbridge was practically completed. The important works for remedying the surcharging of sewers did not advance further than the preparation of plans and specifications. A tender for the execution of the works has now been accepted, and work will be pushed forward. The water-works were maintained in an efficient state. The repairs to the Tulsi Outlet Tunnel, begun in 1904, were completed. Progress was made with the works for remedying the leakage from the Bhandarwada Reservoirs and filter beds. The number of water connections were 21,863, compared with 21,579 in the previous year, and of these 3,260 were metered against 3,117. The laying of additional water mains in various parts of the City was continued.

Madras Presidency. Municipalities in the Madras Presidency spent larger sums under the heads "Drainage" and "Conservancy, roads and plague," and a smaller sum under "water supply" (new works), than during 1905-06. Of the total allotment for sanitary works by District Boards, 50·5 per cent only was spent, which is said to savour of apathy in the matter. In some municipalities which evidence a desire to accept advice and carry out reforms, the paucity of funds is a drawback: the result is that petty works only are possible, except when Government subsidizes funds with grants for water-supply and drainage schemes. The Vellore, Nellore and Gudiyattam water-works were completed during the year, but the Saidapet scheme was in abeyance pending orders as to the exclusion of the head-works from cantonment limits. The improvements to the Guntur water-works were completed and those to the Cocanada and Cuddapah systems were in hand. The delay caused by excessive rain to work on the Ootacamund drainage scheme was more than made up in the last five months of the year: the scheme has so far answered expectations and the improvement in the sanitation of the bazar is said to be very evident. Sewage farming was not successful from a financial point of view, due more to defective methods and bad management than to deficient manurial value in sewage.

The Sanitary Board advised on sanitary schemes of the estimated cost of £54,894. Of the total number, 25 works estimated to cost £46,202 were for Municipalities, and 50 estimated to cost £8,692 for Local Fund Boards.

Madras. A Special Engineer was appointed for drainage and water-works and pending the arrival of Mr. J. W. Madeley, who was appointed by the Secretary of State for India and joined his appointment in December 1907, but little progress with drainage works was possible; some minor useful work was however done. The Corporation Engineer took up the preliminary investigation of a revised scheme for the drainage of the first three divisions and completed a scheme for the removal of the nuisance caused by the overflow of sewage into the Kelly drain. Certain drainage works were completed by the ordinary staff during the year. The new water-supply scheme was held over for the Special Engineer who had, at the close of the year 1907-08, been engaged in studying the details of the scheme and making preliminary arrangements. A special investigation was undertaken by Mr. A. Nowroji for improving and extending the distributary system of the water-supply of the City. Mr. Nowroji was subsequently appointed Water Works Assistant to the Special Engineer.

ABSTRACT OF THE REPORT OF THE SANITARY COMMISSIONER WITH THE GOVERNMENT OF INDIA FOR 1907.

Meteorology of the year.

Summary of the meteorological phenomena of the year.

The following information has been furnished by the Meteorological Department of the Government of India, the monthly summaries being extracted from the Monthly Weather Reviews published by the Department.

Meteorology of the seasons.

The cold and hot weather periods.—January was a very dry month over by far the greater part of the country and temperature was in marked excess, while humidity and cloud were below the average, but at the beginning of February a period of disturbed weather set in which lasted until the beginning of May. During this time an unusually large number of very active cold weather depressions crossed northern India and gave rainfall on the plains far in excess of the normal in February, March and April, and very heavy snow in the hills, down to unusually low elevations. Weather was in consequence damp, cloudy and cold.

The hot weather did not set in definitely until May and although this month was very dry yet temperature in north-western India and the central parts of the country was from 2° to 3° below normal, probably owing to the heavy snowfall on the Himalayas; the hot weather conditions were prolonged in north-west India, the United Provinces and Central India until the third week in July when the monsoon broke. A cyclonic storm which passed over Karachi on the 6th June travelled up the Indus valley and gave heavy rain in the south-west and central Punjab but this was the only rainfall that occurred in these parts during this period.

South-west monsoon.—The monsoon was a few days late in reaching the coast districts but its extension inland was exceedingly slow and it did not reach the United Provinces and north-west India until the 21st July. From this date until the 24th August the monsoon was very vigorous in all parts of the country and the rainfall was well distributed, but during the last week of August the monsoon withdrew abruptly and by the 30th of the month was confined to Burma, north-west India and the Peninsula. The monsoon continued its retreat during September and the Arabian Sea branch was very weak, in consequence very little rain fell outside of Burma, north-east India and the Peninsula.

The aggregate precipitation of the period was more or less below normal throughout the country with the exception of Lower Burma, Assam, Orissa, Chota Nagpur, Baluchistan, Sind, Rajputana West, Mysore, the Bombay Deccan, Malabar and the Konkan. The proportional defect was moderate in amount in the Bay Islands, Upper Burma, the Punjab East and North, and Central India East and was large in the United Provinces, which obtained about half their average supply. In Upper Burma and the United Provinces West the defect was shown in all the four months of the season.

On the mean of the whole country the monsoon rainfall was 9 per cent short of the normal.

The retreating monsoon period.—Weather during this period was almost as dry as in the corresponding seasons of 1899 and 1900. The Bay current was much weaker than usual during October and November, and in the latter month was determined chiefly to the Bay Islands to which it gave excessive rain. As happened in 1906 a considerable revival of the activity of the monsoon in the Bay occurred in December and in conjunction with a cyclonic storm from the Bay and unsettled conditions from the Central Provinces produced widespread and, for the time of year, heavy rain over the greater part of north-east India, of Burma and on the north Madras coast. The final burst of monsoon rainfall occurred between the 13th and 20th, and was restricted mainly to the south of the Peninsula. The complete withdrawal of humid monsoon winds from the Bay accordingly took place a few days later than usual.

In north-west India and the Persian region the weather was unusually quiet and dry, and at the close of December there were no indications of an immediate change.

The data of the meteorological stations show that absolutely no rain fell throughout the period in the United Provinces, the Punjab, the North-West Frontier Province, Rajputana, Sind, and but little in Central India. Over the rest of the country more or less rain was received, chiefly in December; but even there it was below the average except in Burma and the Bay Islands. The actual deficiency ranged between two and four inches over the greater part of north-east India and of the Peninsula, and was absolutely greatest in Orissa and the Konkan where it averaged five inches.

As is usually the case during periods of scanty precipitation the air was drier, skies less clouded and temperature higher than the average over a large part of the country.

Monthly Summaries.

January.—The weather was comparatively warm and dry and the skies clear over the greater part of northern India, and no very marked depressions occurred in the winter storm-track to give heavy rainfall in the plains or deep snowfall in the hills. Snowfall was generally light. In the Frontier Province, however, and in the Punjab hills, precipitation was in excess, while in Assam and Burma rainfall was exceedingly abundant, and measured 215 and 363 per cent respectively above normal. In the Peninsula rainfall was more or less in defect except in the south; temperature was normal and cloud proportion was almost uniformly high.

For the greater part of the month temperature was high in the north-west and warm waves spread over the whole of northern India between the 6th and the 9th and, after a spell of cooler weather, between the 19th and the 25th. High temperatures thereafter persisted until the 30th, on which day a cold wave began to traverse India eastwards from Sind.

February.—The weather during the month was chiefly characterized by excessive precipitation in northern and central India, caused by a series of cold weather depressions which crossed the country from Persia. On two occasions the depressions were followed by cold waves of moderate severity, and owing to

the disturbed character of the month maximum temperature was in large defect over northern and central India, but at night on account of the prevalence of cloud, temperature was nearly normal.

March.—Weather over northern India presented the same general characteristics as the preceding month, being very wet and cold. An exceptionally large number of cold weather disturbances crossed northern India, and in two cases they were accompanied by severe cold waves, maximum temperatures from 20° to 28° below normal being reported from many stations. The unusual number of disturbances, with the consequent wet and cloudy weather, caused abnormally low temperatures over the whole of northern India, the deficiency being much more marked in the maximum than in the minimum.

The rainfall of the month was in very large excess over Burma, north-east India, the United Provinces, the Punjab and Madras. In Burma where very little rain is usually received the heavy rainfall occurred most unseasonably.

April.—The first nine days of April had all the characteristics of the early ushering in of the hot weather but on the 10th a sudden change occurred and the rest of the month was abnormally wet over the whole country, excluding Burma and parts of north-east India; the greatest excesses of rain occurred in the United Provinces, the Punjab, Central India, the Central Provinces and the Deccan, areas that usually receive little rainfall in April. Temperature was in large defect over the greater part of northern and central India, the deficiency occurring chiefly in the maximum and amounting to 8·5° in the Punjab, 6·9° in the United Provinces, 7·8° in the Central Provinces and 7·3° in Central India. Humidity both absolute and relative, and cloud proportion were greater than usual.

May.—The chief feature of the weather during May is the very high temperature that prevails over the whole country, but especially in northern and central India; this year however this feature was not as strongly pronounced as usual, and both day and night temperatures were below normal in north-west India and the central portions of the country during almost the whole month.

There were two feeble preliminary advances of the south-west monsoon into the Bay of Bengal, and they were accompanied by cyclonic storms of moderate intensity. The first storm formed over the Andaman Sea and on the 4th crossed the Tenasserim coast near Moulmein where it gave about 26 inches of rain, mostly in one day. The other storm formed over the south of the Bay and crossed the Arakan coast north of Diamond Island on the 15th; it caused general and moderately heavy rain in Lower Burma. Rainfall was in moderate to large defect over the whole country except in Lower Burma where the two storms gave a large excess.

June.—During the first advance of the monsoon in the Arabian Sea a severe cyclonic storm formed at some distance from the coast and passed over Karachi: it then travelled up the valley of the Indus as a depression as far as the Punjab hills and gave widespread and heavy rain in Sind, the south-west Punjab, the North-West Frontier Province and Baluchistan. The second advance of the Arabian Sea current began on the 11th and it established

monsoon conditions on the west coast. In the Bay of Bengal two cyclonic storms of more than the usual severity formed, and gave moderately heavy and general rain over north-east India.

The monsoon set in on the west coast, the east coast, north-east India and Burma, about the usual date and the rainfall in these areas as well as in the remainder of Madras, in Mysore and Hyderabad approximated closely to the normal. The monsoon however did not penetrate into the United Provinces, the Punjab, Rajputana, Gujarat, Central India and the Central Provinces during the month; but owing to the storm which passed over Karachi travelling northwards the rainfall in Sind, the south-west Punjab, the North-West Frontier Province and Baluchistan was in very large excess; in the rest of this region rainfall was in very large defect, especially in the west of the United Provinces.

Temperature was high in the United Provinces, Central India and the Central Provinces, but owing to the snow in the mountains it was in large defect in Kashmir, Baluchistan and the neighbouring plains. Humidity and cloud were in marked defect over the United Provinces, Central India and the Central Provinces.

July.—The outstanding feature of the weather during July was the prolonged delay in the establishment of the monsoon over northern and central India west of Bengal with the consequent high temperatures and low humidities until the rains finally set in on the 20th. From this date until the end of the month rain fell in all parts of the country except in Sind, west Rajputana and parts of Madras, but it was not nearly sufficient to make up for the deficiency in the earlier part of the month. In the Peninsula, however, the rainfall was heavier than usual in most places and was over 60 per cent in excess in the Madras Deccan; there was also an excess in Eastern Bengal and Assam, but in all other parts of India rainfall was in defect, the deficiency being very large in Orissa, Chota Nagpur, the United Provinces, the Punjab, Sind, Rajputana, the east of Central India and the Central Provinces excluding Berar.

August.—During the first three weeks of the month strongly marked monsoon conditions prevailed over the whole country except in the south-east of Madras and although three cyclonic storms formed in the Bay the second was the only one that succeeded in crossing the country into north-west India; this storm gave general and heavy rain to the south of its tract and a deluge of rain at Deesa and Mount Abu. Apart from this the rainfall occurred independently of cyclonic storms and was thus much more evenly distributed than usual. Rajputana, the south-west Punjab, Sind and Gujarat, the dry regions, received relatively to the normal the heaviest rainfall.

During the last ten days of the month the monsoon currents weakened and withdrew entirely from north-west India, the United Provinces, Central India and the Central Provinces. The rainfall of the month was in large defect in the Madras Deccan and south-east Madras, areas that usually receive a fair amount of rain in August, and there was also a deficiency in Upper Burma, Eastern Bengal and Assam, Bengal and Bihar, but over the rest of the country the rainfall was generally in excess, the only important exception being the United Provinces which barely received the normal amount. The rainfall for the whole country was 22 per cent in excess and was the heaviest on record for August since 1900. The departures from normal of temperature, humidity and cloud were largely determined by the rainfall and were generally small and of little significance.

September.—The chief feature of the meteorology of September was the extreme weakness of the monsoon currents throughout the month with the consequent scantiness of rainfall over by far the greater part of the country. From the whole of northern India, excluding the north-east, the monsoon had withdrawn during the last week in August, and north-west India, the United Provinces and the east of Central India received almost no rainfall; instead westerly winds prevailed in the last two areas as well in the east Punjab, and in consequence the moisture in the air was much less than normal and temperature was in excess. In the west of Central India and in the Central Provinces rain fell on several days during the month, especially from the 9th to the 11th in the latter area but the total fall for the month was far short of the normal and the air was drier and hotter than usual.

In Burma and north-east India monsoon conditions prevailed throughout the month and three feeble depressions developed. They materially increased the activity of the Bay monsoon and rainfall was widespread in these areas. In Upper Burma, the Thayetmyo, Yamethin, Minbu and Mandalay districts received a very scanty supply of rain, but otherwise the rainfall in Burma and north-east India was approximately normal. In the Peninsula the monsoon though generally weak was most active in the interior districts during the last ten days, but the rainfall for the month was in large defect except in Mysore and south-east Madras.

October.—October like September was characterized by the general weakness and gradual retreat southward of the monsoon so that by the end of the month rainfall was confined to south Burma and the south of the Peninsula.

Two cyclonic storms formed in the Bay during the month and the first was the cause of heavy rain over the whole of Burma, while the second gave good rain in south Burma. Burma was thus the only large political division that received more than the normal amount of rain, and in Malabar and south-east Madras the total fall was not much below the average, but in the rest of India the deficiency was very large and in the United Provinces, Central India, the Central Provinces and Hyderabad no rain fell during the month; this in view of the previous drought was important as these areas usually receive a fair amount of rain. In north-west India, there was also no rainfall but the normal amount is quite insignificant.

Except in Burma and south India where monsoon conditions prevailed during the month temperature during the day time was in excess, the excess being large in the United Provinces and the central parts of the country, and in these areas in consequence of the total absence of rain the air was much drier than usual and the skies comparatively free from cloud; in north-east India the cloud proportion at 8 hrs. was also in large defect.

November.—The monsoon which by the end of October had retreated as far south as the Andaman Islands and south India was very active in these parts throughout the month, and being assisted by a series of four cyclonic storms which passed westward from the Andamans to south Madras, gave a large excess of rainfall in south Madras and the Madras Deccan. Two of the storms had sufficient vitality to pass out into the Arabian Sea and after the second had disappeared in the Arabian Sea an area of low pressure appeared over the head of the Peninsula; it travelled eastward and as favourable conditions had been

established by the previous depression, it caused a good burst of rain over Hyderabad, the Central Provinces and adjacent districts of Central India. There was also heavy rain in the Andaman Islands but over the rest of India weather was dry with clear skies; higher day temperature and lower humidities than usual.

December.—No cold weather depression of any importance from a rain-producing point of view crossed into north-west India from the west during the month, and weather was in consequence dry over north-west India, the United Provinces and Central India, except that light precipitation occurred in Kashmir and Baluchistan at the end of the month. The unsettled weather in the Central Provinces at the end of November was propagated eastward into Burma and in conjunction with a cyclonic storm in the south-east of the Bay gave heavy and general but most unseasonable rain over Burma, excluding Tenasserim. Weather again became unsettled in the east of the Central Provinces about the 11th and this time the disturbance passed into north-east India where it caused moderately heavy rain except in the north-western districts, and also gave good rain on the north Madras coast. In south India wet weather conditions prevailed from the 13th to the 22nd, and by the latter date the monsoon had retreated from the Indian area. Temperature was generally normal but in northern India the minimum showed a slight defect in many parts, while cloud and humidity were less than usual over a large part of the country.

European Troops.

(For statistical Tables, *see* pages 138 to 142.)

India.

The average daily strength of the European army of India during 1907, excluding officers, was 69,332. Apart from the prevalence of plague, which scarcely affects the statistics of troops, the year was not an unhealthy one for the general population of the country, and as regards the health of the European troops it will be seen from the statement in the margin that the rates of admission to hospital, of constantly sick, of mortality and of invaliding among them were all much lower than those of the previous year and of the antecedent quinquennium; the first three rates were, indeed, the lowest ever recorded among the European army in India. The decrease in sickness was due chiefly to fewer admissions on account of venereal diseases, ague and simple continued fever (the chief causes of sickness during the year), but nearly all the more important diseases were less prevalent than in 1906.

India.	All causes. Ratios per 1,000.		
	1901-05.	1906.	1907.
Admissions ...	983·7	870·8	750·4
Constantly sick ...	60·7	51·4	46·4
Deaths ...	12·11	10·43	8·18
Invalids ...	32·09	28·36	25·50

The principal causes of death were, as usual, enteric fever and abscess of the liver. Excluding the mortality caused by these two diseases the death rate for the year was only 4·40 per thousand, a rate which is scarcely more than one and a half times as high as the similar rate usually recorded among troops serving in the United Kingdom. The mortality from each of the more important diseases except tubercle of the lungs was lower than in the previous year.

The chief causes of invaliding were, in order, ague, debility, tubercle of the lungs, valvular disease of the heart, enteric fever, disordered action of the heart, and syphilis, these causes together accounting for 889 invalidings (one half of the total number) as compared with 939 in 1906. The number of men sent home on account of ague rose from 135 in 1906 to 266 and on account of tubercle of the lungs from 92 to 107, but only 76 men were invalided for syphilis and 86 for enteric fever, as compared with 120 and 115 respectively in the previous year.

If the marginal tables in the first paragraphs of this and the following section be compared, it will be seen that the admission rate among European troops during 1907 was nearly one and a quarter times as high as that among Native troops, that the constantly sick rate was more than twice as high, and that the invaliding rate was more than four times as high. The death rates among European troops and Native troops were respectively 8·18 and 6·27 per mille, but these rates are not fairly comparable.

Northern and Southern Armies. Divisions. Stations.

In the statistical tables appended to this report the abstracts of the figures are arranged this year under the headings Northern and Southern Armies instead of under those of the three Commands and two Divisions, as in the

reports from 1904 to 1906. This change is due to the orders contained in India Army Order No. 204, dated the 11th of May 1907. At different times during recent years changes of a similar nature have had to be made in the arrangement of the tabular summaries or abstracts.

The relative healthiness of the troops comprising the Northern and Southern Armies can be ascertained very easily with the aid of Table I (A) to this section, and although the administrative change just referred to did not come into force until the 1st of June 1907, the statistics have been worked out as if it had come into force on the 1st of January 1906, so that the comparison can be made for two years. It will be seen that during both years there was more ill-health among the troops which now comprise the Southern Army than among those of the Northern, and that the higher rate of invaliding in the Southern Army is especially noteworthy. The statistics in Table II show that in 1907 venereal diseases, simple continued fever, dysentery, diarrhœa and enteric fever were the diseases which caused the admission rate among troops of the Southern Army to be higher than that among those of the Northern Army; nearly all the other chief diseases were less prevalent in the Southern Army. The death rate from all causes was fractionally lower in the Southern than in the Northern Army, due almost entirely to the smaller mortality from heat-stroke, tubercle of the lungs and pneumonia; the mortality from enteric fever, hepatic abscess, and most of the other chief diseases was higher in the Southern Army. As regards the Divisions Table I (A) the statistics of the 1st (Peshawar) Division were the least favourable during 1907, the rates of admission to hospital, of constantly sick, and of mortality being respectively 1158, 61 and 5 per thousand. The 9th (Secunderabad) Division stands next in the list with an admission rate of 780, a constantly sick rate of 62, and a death rate of 8 per thousand; and the 7th (Meerut) Division next with rates of 821, 52 and 10 per thousand respectively. As in 1905 and 1906 the health of the European troops in the 2nd (Rawalpindi) Division and the 3rd (Lahore) Division was better than in the other Divisions during 1907.

This year seven stations, namely, Fort William, Barrackpore, Rurki, Ferozepore, Amritsar, Agra, and Ahmednagar come in the list of those which, according to the statistical method adopted in this report, are to be regarded as having been most unhealthy during the year. Full abstracts of the cantonment sanitary reports on these stations will be found in Table V of the Sanitary Commissioner's report, and it is not necessary to do more than mention them here. As regards the prevalence of important diseases in the larger plains stations (those where the average annual strength was 500 or more) the incidence of enteric fever was greatest at Jhansi, Bangalore, Ahmednagar and Agra; of malarial fevers at Nowshera, Nasirabad, Peshawar and Ferozepore; of dysentery at Madras, Mhow, Fyzabad and Secunderabad; and of venereal diseases at Fort William, Madras, Bellary and Agra.

Geographical groups.

In Tables I (B) and III to this section will be found the statistics of European troops arranged according to the geographical areas into which India has been divided for the purposes of this report. It will be seen that the admission rates were lower than in 1906 in all the geographical groups, and that the constantly sick rates were lower in all except groups XI (Southern India) and XII *b* (Hill Depots). In attempting to compare the relative healthiness of different groups

we are met with the difficulty that the average strength varied in 1907 between 1,294 in the Burma Coast group (I) and 13,391 in the Upper Sub-Himalaya group (VI), and in groups where the strength is low a slight increase or decrease in the number of deaths alters the death rates considerably. Taking this difficulty into consideration, however, we may say that during 1907 groups IV (Bengal—Orissa) and VIII (Central India) were the most unhealthy for European troops, and that the Hill Stations (XII*a*) were the most healthy; this is in accord with general experience. Ague was most prevalent among the troops located in the Indus Valley, the Central India and the Upper Sub-Himalaya groups, simple continued fever among those in the Burma Coast group, and enteric fever among those in the Central India group.

Influenza.

Influenza caused an admission rate of 12·5 per thousand among the European troops as compared with 11·4 per thousand in the previous year and 14·2 in 1905. The disease was confined almost entirely to the troops of the Northern Army, those located in group VII (Indus Valley) being affected to the extent of ninety per thousand of their strength. Cases were reported from forty-five stations, but in most the number was very small, and Peshawar, Cherat and Nowshera were the only stations in which the disease prevailed in epidemic form. In Peshawar the disease was present throughout the year, but of the 262 cases more than half occurred during the months of May, June and October. Cherat is a hill station at an elevation of about 4,500 feet; cases of influenza occurred soon after the arrival of troops from Peshawar. The disease spread rapidly, and during July and August 99 patients suffering from it were admitted to hospital. The outbreak was over by the middle of October. At Nowshera there were 145 cases admitted into hospital, chiefly during the months of May, August and October. In most stations the disease was of a mild type, and many men who suffered from it did not report sick; no case was fatal during the year.

Cholera.

Cholera was less prevalent and less wide spread among the general population of India than in 1906, and only three cases (with two deaths) occurred among the European troops during the year, the number being, with the exception of that in 1899 when only one case occurred, the lowest on record. Cawnpore, Amritsar and Colaba were the stations in which a case of the disease occurred. In no instance was the source of infection discovered.

Small-pox.

Small-pox was also less prevalent in India, and there was a marked decrease in the number of cases among European troops, only thirty admissions to hospital and one death being recorded as compared with 87 admissions and four deaths in 1906. Sixteen of the cases occurred among men who had not been successfully re-vaccinated. One or more cases were recorded in thirteen stations; there were seven at Multan, four at Calcutta, four at Secunderabad, three at Jullundur, two at Quetta, and one at each of eight other stations. Two cases occurred among troops on the line of march. The incidence of the disease at Multan is interesting inasmuch as all the patients were attacked during the same fortnight. It is said that the infection was definitely traced to the native washermen who were in the habit of taking clothing which had been washed, but not dried, into houses in the infected native quarter of the town, and that as soon as this practice was stopped the outbreak ceased. The patient who died at Ahmednagar had been vaccinated in infancy, but had not been re-vaccinated.

The monsoon rains of 1907 ceased early and the autumn was very dry, so that malarial fevers were not so prevalent as usual. Among European troops the number of admissions to hospital on account of intermittent fever fell from 12,380 (176 per thousand) in 1906 to 10,538 (152 per thousand), and the number of deaths from sixteen to nine. Native troops, and prisoners also suffered less severely than in the previous year. Malarial fevers were more prevalent among the troops of the Northern than of the Southern Army, and as regards the Divisions the highest admission rates were recorded as usual among troops in the 1st (Peshawar) Division, 5th (Mhow) Division and the 4th (Quetta) Division. The most malarious geographical groups were the Indus Valley, Central India and the Upper Sub-Himalaya groups. Finally, as regards stations, it may be noted that excluding the Hill Stations (in which of course the admissions are almost entirely on account of relapses) a diminished prevalence among European troops as compared with the previous year was recorded in thirty-seven stations, and an increased prevalence in only twenty-eight; and that omitting stations with an average strength below 200 the highest rates were recorded at Nowshera, Hyderabad (Sind), Nasirabad, Peshawar, Delhi, Ferozepore, and Barrackpore. The admission rates in all these stations were above 320 per thousand, but in all except Ferozepore they were lower than in 1906.

Intermittent and remittent malarial fevers, Simple continued fever.

The number of admissions recorded under the heading remittent fever during 1907 was 124, and the number of deaths five as compared with 240 admissions and five deaths in the previous year. The highest number of admissions in any station was 33 at Maymyo; the next highest numbers were eighteen at Agra, seventeen at Ferozepore, fourteen at Rangoon, seven at Port Blair, and six at Dinapore. In accordance with the instructions in the new edition of the Nomenclature of Diseases the heading will not appear in the statistical returns for 1908 and future years.

In the last issue of this report a table was given showing the extent to which the admissions recorded as due to simple continued fever have increased during recent years, and a second table made it plain that the increase is the result of a change in diagnostic procedure—a number of the cases which with the present method of diagnosis are recorded under the heading simple continued fever would have been returned, a few years ago, under the heading ague. This is doubtless true also as regards the statistics of 1907, for the number of admissions to hospital recorded as due to simple continued fever was 2,553, and the admission ratio 36·8 per thousand, which, though lower than in either of the two preceding years, is much higher than in any of the other years since 1898. It is obvious, of course, that in stations where it is the practice to return cases as malarial fever only when parasites are found at a microscopical examination of the blood the statistics must be affected in the manner indicated, but the important problems for solution are what proportion, if any, of the cases now returned as simple continued fever are due to malaria, and what are the causes of the cases which cannot be shown to be due to that disease. Greater attention will probably be paid to these problems now the heading "Pyrexia of uncertain origin" replaces the heading "Simple continued fever" in statistical returns.

This year very few medical officers offer any remarks upon the subject of "simple continued fever," and for the most part those who do are content with the explanation that the disease is due to digestive troubles or to exposure to the sun. In most

Summary of the reports of Medical Officers.

cases the blood was examined for malaria parasites, and in a few the serum test for enteric fever was also carried out, the results of both these diagnostic methods being negative. The reports upon malaria are, as usual, very full, and it is evident that in most stations every detail in connexion with the prevention of this disease receives attention. At the Divisional laboratories 6,633 films of blood were examined for malaria parasites, with a positive result in 2,415 instances or 36·4 per cent. As regards the species of parasite found, 78 per cent. were *Benign Tertian*, 19 per cent. were *Malignant Tertian*, and about 1·2 per cent. were *Quartan*. These results are very similar to those obtained in the previous year and in 1905, and it must now be regarded as established that among European troops in India the *Benign Tertian* parasite is by far the commonest. The practice of relying entirely upon the result of a microscopic examination of the blood for a diagnosis of malaria was not adopted so generally as in the previous year, chiefly because the result was negative in so many instances. In most stations the negative results were attributed to the general use of quinine for prophylactic purposes, and in some to the infections being less severe than in very malarious years. The latter hypothesis receives some support from the fact that there were 4,942 cases of ague treated in barracks during the year as compared with 4,317 during 1906, a very malarious year. The treatment of cases in barracks instead of in hospital affects the statistics considerably, because such cases are not shown as admissions to hospital; if they were included the admission rate from ague among European troops in 1907 would have been 223 per thousand instead of 152, and from simple continued fever it would have been 46·2 instead of 36·8. The treatment and especially the "after-treatment" of patients suffering from malaria is now carried out much more thoroughly than formerly; treatment by intramuscular injections of quinine is adopted for severe cases in a number of stations, and in nearly all stations the after-treatment of patients is continued for at least six weeks after their discharge from hospital. This practice has reduced considerably the number of re-admissions on account of relapses, and has therefore been an important factor in reducing the admission rate. At Bareilly there were only seven instances of re-admission to hospital among 63 primary cases, and at Ahmednagar there was no re-admission among 36 cases. As regards the prevention of primary attacks it is being realised that for the European soldier measures of prophylaxis "for the individual" are of most service, and in some stations a distinct advance has been made in this connexion by the provision of mosquito curtains to all European soldiers. When it is stated that soldiers in stations with climates so widely different as are those of Peshawar, Delhi, Agra, Dum Dum, Colaba, Bhamo and Rangoon, willingly and intelligently used the mosquito curtains provided for them, and that many soldiers in these and other stations purchased curtains at their own expense, it will be appreciated that there can be few, if any, stations in India where the heat is such that soldiers would object to use nets. At Delhi, Agra and a few other stations the nets were issued to the men free, but at Peshawar men of one regiment provided them at their own expense aided by a grant of one rupee per man from institute funds, and at Colaba a portion of the "mosquito fund" was utilized for this purpose, and other nets were purchased by a grant from the regimental funds of one regiment. The measure is especially necessary in forts, such as those at Ferozepore and Lahore, located in cities where anti-mosquito operations cannot be carried out. The garrison in these forts consists of a company or more of soldiers from the cantonments and is changed every month. It is obvious, of course, that the good results which may be obtained by extensive

anti-mosquito and other anti-malarial operations in the cantonments are to a great extent minimised by the fact that in the course of a year a large number of men must become infected during their tour of duty in the fort. The other measure of personal prevention most extensively practised was the administration of prophylactic doses of quinine. In by far the greater number of stations the doses for this purpose were ten grains of the sulphate given either in the liquid form or as tablets on two days in each week, but at Attock, Khan Spur, and Delhi, the same dose was given three times a week, and at Colaba once a week; at Karachi and Neemuch the dose was fifteen grains given twice a week and at Hyderabad (Sind) it was eight grains given once a week. In a few stations the measure was adopted only for men who had previously suffered from malaria. Operations for the destruction of mosquitoes were, as usual, carried out with much attention to detail in nearly all stations on the plains, and in a few stations surface drainage works of permanent benefit were initiated. Among other methods which were tried for the prevention of malaria may be mentioned the practice of keeping troops in hill stations until the malarial season on the plains was over, the removal of troops into camp during the malarial season (an application of the principle known as "the segregation of Europeans"), the fumigation of barrack rooms with sulphur every three weeks to destroy adult mosquitoes, the free distribution of quinine to natives living in the neighbourhood of barracks and to *punkah coolies* and servants, and the issue of printed instructions regarding the prevention of malaria to all inhabitants of cantonments.

Malta Fever.

Five admissions to hospital during 1907 were due to Malta fever as compared with seven in the previous year, four in 1905 and six in 1904. The stations in which the cases occurred in 1907 were Peshawar, Sialkot, Subathu and Chakrata. The patient at Peshawar had not been out of England until he came to India. Malarial fever and afterwards enteric fever were the diseases for which he was treated when first admitted to hospital and a month elapsed before the diagnosis was established by a serum test being made with a culture of the *Micrococcus melitensis*. The test was positive in a dilution of 1 in 400. The case at Sialkot was a relapse of an attack in Egypt in 1898. The *Micrococcus melitensis* was recovered from the blood of this patient. The infection in the case at Subathu is said to have been contracted from drinking goat's milk while the patient was in hospital at Port Said.

Enteric fever.

Recent investigation.—[*The yearly summary of literature upon enteric fever and commentary upon recent investigations is omitted from the present abstract.*]

Preventive measures.

All who have studied recent discoveries relating to enteric fever are agreed that the only right method of preventing the disease is to detect and render innocuous those who harbour the bacillus; and the examples of outbreaks mentioned on the previous pages of this report afford sufficient evidence of the success of measures based on this view. Kirchner has published a full account of the operations on these lines undertaken during the last four years at a cost of about £10,000 per annum in a number of districts in Germany and although the difficulties of the task of detecting all those who harbour the bacillus are very great in large civil communities he shows that a substantial decrease in the mortality from enteric fever has occurred. In India the matter is being taken up with energy

and the recommendations passed by the Standing Committee on Enteric Fever (which were based on the results of the work of the Committee of Investigation) are at present being acted upon. Of these recommendations the following were the most important: (1) " As a considerable proportion of convalescents from enteric fever harbour and excrete typhoid bacilli, sometimes for long periods, they are a source of danger to troops. It is, therefore, strongly recommended that accommodation be provided in the hills for isolating convalescents from enteric fever, away from other troops. The places selected for this must have at their command bacteriological laboratories where cultivations from the excreta can be made daily to determine when the individuals are free from infection : also efficient means for disinfection." (2) "It has been proved that a proportion of those who have suffered from enteric fever either in a form recognised as such or so slightly as to escape recognition and of those who have been in close contact with them harbour and excrete typhoid bacilli for considerable periods while showing no symptoms of illness. The handling of food by such persons is a great source of danger to others, and outbreaks of the disease have been definitely traced to this source. It is, therefore, strongly recommended that all men, British and Native, whom it is proposed to employ in connection with food intended for British troops, in kitchens, officers' and non-commissioned officers' messes, regimental and other institutes, Government and regimental dairies, bakeries, mineral water factories, etc., should first be medically examined to detect and prevent the employment of any who may be harbouring the infection of enteric fever. No man who has recently suffered from enteric fever should be so employed until it has been placed beyond all doubt, by repeated bacteriological examinations, that he no longer harbours the *B. typhosus*. In cases where means for carrying out these examinations are not available, such men must not be employed. Excepting those who have recently suffered from enteric fever or have been inoculated, the Widal test should, whenever possible be applied, and all whose blood gives a positive reaction should be considered unfit for such employment. All men employed in these occupations should be inspected from time to time by a medical officer for the same purpose." (3) "As it is found that orderlies nursing enteric fever cases suffer from the disease in considerably greater proportion than other men and a certain number of cases occur in patients under treatment in hospital for other diseases, it is recommended that, (1) all such men not protected by a previous attack of the disease should be inoculated, and the operation repeated when one year has elapsed since the previous inoculation. (2) In selecting men for such employment, preference should be given to those whose age and service in India make them less liable to infection. (3) Orderlies nursing enteric fever cases should not be allowed at the same time to attend other cases." (4) " The present system of employing soldiers of combatant units for nursing enteric fever cases is considered a great danger; these men mix freely with their comrades and at short intervals return to duty with their units. A certain number have been found to be harbouring the *B. typhosus* in their bodies without suffering from any symptoms of disease, but capable of spreading enteric fever to others. To avoid what may be a frequent means of spreading the disease, it is considered urgently necessary that a special corps of male nurses, whether of the Royal Army Medical Corps or men specially enlisted for India, should as soon as possible, be instituted."

The first depôt for enteric fever convalescents was started at Naini Tal in April 1908 and it is hoped that others will be started shortly. The second and third recommendations are being carried out in their entirety but as regards the

fourth, steps have not yet been taken for the formation of a special corps of male nurses.

Reports from Medical and Sanitary Officers.

Among European troops in India enteric fever does not occur in the form of well-marked epidemics; in nearly all stations the cases are fairly evenly distributed over the months during which the stations were occupied by troops. During 1907 there was only one station, namely, Bangalore, in which more than eighteen cases of enteric fever occurred during any month. The outbreak which caused the comparatively large number of admissions (28) during the month of June at this station was the only one which, with good reason, was attributed to water during the year. It was confined to two companies on field training at a camp ten miles from Bangalore, and presented the well recognised characters of an outbreak caused by water. At the time these two companies occupied the camp the spring which was the usual source of supply for troops failed, and water had to be obtained from a pond. The water for drinking purposes was boiled and stored in filters, but it is said that there may have been a flaw in the arrangements or that the men may have drunk unboiled water. The pond water was found to be grossly polluted with *B. coli*. Milk was very probably the cause of cases in several stations. At Agra, for example, the Divisional Sanitary Officer attributed six cases to the milk supply of the soldiers' home. He states that the milk used in tea and for making ice-creams in this home was obtained from a bazaar, and that it was unboiled. He visited the bazaar dairy and, no milk being obtainable, took a sample of water from an earthenware vessel used for storing water. From the sample he succeeded in isolating a bacillus which gave all the typical cultural reactions of the typhoid bacillus and was agglutinated by a proved typhoid serum. At Muttra a small outbreak of six cases occurred in a unit which had been free from enteric fever for several weeks, and milk was suspected to be the cause. The regimental dairy was reported to be small, dark, and ill-ventilated; there was a latrine close to it, and the arrangements for the sterilization of milk and utensils were not good. At the time of inspection by the Divisional Sanitary Officer the orderly in charge of the dairy was in hospital with symptoms which were said to be suspicious of enteric fever. Other stations in which milk was a probable cause of infection were Ranikhet, Kampti and Colaba (ice-creams). As regards other kinds of food and drink, uncooked vegetables and salads purchased from native hawkers were considered to be the cause of cases in Sialkot and Jullundur, and mineral waters in Ahmednagar. Contact infection directly from person to person and indirectly through the medium of latrines, as usual, figured largely in the reports as the most probable way in which the disease was contracted. As examples of infection by direct contact may be mentioned the fact that fifteen cases during the year were reported to have occurred among orderlies on duty as nurses in enteric fever wards, and five cases occurred among patients while in hospital for other diseases. At Ahmednagar a man became infected apparently from using the towels or clothing of a friend who shortly before had been admitted into hospital for enteric fever, and at Jullundur and Subathu the use of beds in which patients had slept before their admission to hospital was suspected to be the cause of subsequent cases. In connection with infection by contact the possibility that cases were due to an undetected bacillus-carrier is suggested by several medical officers and at Kasauli, in addition to those reported last year, yet another example was found of an outbreak being due to a bacil-

lus-carrier in the person of a cook. In this instance the man was in robust health, he had never suffered from enteric fever, and had not been admitted into hospital at all during the seven years previous to the time when the bacilli were found in his excreta. From the same station it is reported that the excreta of four nursing orderlies who had been nursing patients suffering from enteric fever were examined before the men were about to be sent back to regimental duty. It was found that two of the men were excreting typhoid bacilli in their fæces and were bacillus-carriers. Both men were reported to be in perfect health. While recognising the importance of chronic bacillus-carriers, however, the majority of medical officers appear to regard mild and "ambulatory" cases, and the cases in which a soldier, although feeling very ill, does not report that he is so for many days, as the more important; and possibly, rightly so, for such cases are, in all probability, much more numerous than are the cases of healthy bacillus-carriers. A number of instances are contained in the reports in which men did not report that they were ill until it was impossible for them to continue their duties any longer, and apparently the practice is frequent among men who are proceeding, or about to proceed, from the plains to the hills. It was by such cases that the disease was thought to have been introduced into Cherat and one or two other hill stations during the year. Flies were regarded as one of the chief agents by which enteric fever was spread in Rawalpindi, Amritsar, Dagshai, Kampti, Jubbulpore and Secunderabad, and infected dust at Amritsar, Muttra and a few other stations.

Among many valuable remarks and suggestions contained in the reports this year, the following may be mentioned. The medical officer at Ambala draws attention to a possible danger of infection which may exist in the "detention" wards of station hospitals, namely that, unless constant supervision is maintained, the bedding in these wards is likely to be used by different patients day after day; if a bed has been occupied by a patient suffering from enteric fever there is obviously the danger that the next patient who occupies the bed may contract the disease. Several medical officers draw attention to the difficulties met with in attempting to disinfect the bedding and clothing of enteric fever patients and "contacts" in stations where there is no steam disinfector. The medical officer at Ahmednagar notes that it was found that when a patient's kit was sent for disinfection only his "official" kit was sent. It is important, of course, that a patient's private clothing should also be disinfected.

Enteric fever in 1907.

The statement in the margin shows at a glance the number of admissions to hospital, the number of deaths, and the admission and death rates per thousand of average strength, recorded from enteric fever among European troops in India during each of the last five years. It will be seen that the rates in 1907 were considerably lower than usual—indeed, the admission rate was the lowest recorded since 1888 and the death rate the lowest since 1885. The average length of stay of patients in hospital during 1907 was about 80 days as compared with about 75 days in the previous year, about 70 days in 1905, about 68 days in 1904, and about 54 days in 1903. The progressive increase in these figures is doubtless due to a more general application of the principle that convalescents should be kept segregated as long as possible. On

Years.	Admissions.	Deaths.
1903	1384	295
	19·6	*4·19*
1904	1395	267
	19·6	*3·76*
1905	1146	213
	16·1	*2·99*
1906	1095	224
	15·6	*3·19*
1907	910	192
	13·1	*2·77*

account of the reduction in the number of cases the constantly sick rate was less by 24, and the total loss of service due to the disease was less by 8,654 days than in 1906; but the case mortality of the disease rose from 16·7 to 17·8 per cent. During the years from 1896 to 1903, however, the case mortality was never lower than 21 per cent. and since 1903 the fatality shows a distinct tendency to be lower than in former years. Among 7,635 cases during the years from 1898 to 1902 the fatality was 23·4 per cent., while among 6,955 cases during the years from 1903 to 1907 it was only 17·1 per cent.

Enteric fever in the two Armies and in the Divisions and Geographical groups.

The disease was more prevalent and fatal among troops in the Southern than among those in the Northern Army, and as regards Divisions its incidence was greatest among troops in the 5th (Mhow), the 9th (Secunderabad), the 7th (Meerut), and the 2nd (Rawalpindi) Divisions, and least among troops in the 10th (Burma) Division. The admission rates in all except three of the geographical groups were lower than in the previous year. In the group of Hill Stations (XIIa) the admission rate rose from 7·3 to 13·0 per thousand. The practice of sending convalescents to hill stations, unless the arrangements for their segregation are complete, introduces a danger into these stations to which one or two medical officers refer in their reports. The medical officer at Ranikhet states that 32 convalescent enteric patients were sent to that station during the season, but that no building could be obtained in which to accommodate them suitably, and that even if accommodation in tents were considered advisable, there is no good site for a camp. In order that these convalescents might be kept segregated from their companions in barracks it was necessary to admit them into the station hospital and to keep them there for three months or more.

Enteric fever in stations.

The diminished prevalence of the disease during 1907 is indicated by the fact that admission rates of over 20 per thousand were recorded in only 21 stations as compared with 31 in the previous year. The following is a list of stations (irrespective of strength), at which the highest rates were recorded and in Table V are given the admission and death rates in stations where the strength is over one thousand.

In group VI.		In group VIII.		In group IX.		In group XII *a*.	
Fort Lahore	89·3	Jhansi	51·1	Ahmednagar	26·4	Solon	27·5
Amritsar	80·2	Agra	26·0	Jubbulpore	21·5	Ranikhet	27·4
Campbellpore	34·2	Mhow	22·3	Kamptí	21·5	Lower Topa	23·8
Ruiki	24·3			Secunderabad	20·6	Upper Topa	22·4

The stations where the largest numbers of cases occurred were Secunderabad (65), Bangalore (62), Jhansi (49), Quetta (47), Mhow (39), and Rawalpindi (34). The points of interest in connection with the prevalence of the disease at these and other stations have been dealt with in a previous paragraph.

Plague and some other diseases.

Among European troops in India there were recorded in 1907 eight cases of plague and three deaths as compared with seventeen cases and two deaths in the previous year. There were two cases at Meerut and two at Dinapore, the other stations where an admission or a death occurred being

Ambala, Lucknow, Allahabad, Cawnpore, and Rangoon. In all these stations plague was very prevalent in bazaars adjacent to the barracks of the troops. All the cases were of the bubonic variety, and in seven the bacillus of the disease was isolated either from a bubo or from the peripheral circulation. Measles caused 62 admissions to hospital, all except four of the cases being among troops of the Northern Army. Erysipelas accounted for 22 cases and one death. Beri-beri caused 37 admissions, of which nineteen were recorded at Poona, six at Kirkee, and three each at Ahmednagar, Karachi and Aden. The correctness of the diagnosis of beri-beri was by no means certain in some of the cases at Poona and most of the other stations; at Poona fourteen cases of a similar kind were diagnosed as multiple neuritis (probably alcoholic), at Aden nine, and at Ahmednagar four. At Poona the disease became epidemic during September and October, and it was for this reason chiefly that it was diagnosed beri-beri. A committee was appointed to investigate the cause of the disease in Poona, and in their report it is stated that during 1907 there were 60 cases of multiple neuritis among the men of one regiment. The following are some of the conclusions arrived at by the committee:—(1) The disease was multiple neuritis, which, during certain months of the year, assumed an epidemic form. (2) Arsenic as a causative agent could be excluded. (3) With regard to food there was no consumption of rice, no deficiency of nitrogen, and no deprivation of fat. (4) If the disease had not become epidemic it would most probably have been diagnosed as alcoholic multiple neuritis. (5) All the patients were beer drinkers, and no case occurred among teetotallers. Many of the patients admitted drinking from six to sixteen pints of beer daily, which, according to a report from the Director of the Excise Laboratory at Kasauli, corresponds to the consumption of from 6·6 to 17·6 ounces of pure (100 per cent.) alcohol daily. (6) The conditions of life which are usually associated with outbreaks of beri-beri were absent. (7) The view that the disease was simple alcoholic neuritis appeared to be negatived by the epidemic prevalence of the disease in particular months *of a particular year*, but possibly some toxin which caused the disease was introduced, or generated by fermentation, in a particular brew of beer. (8) While believing that the disease was not simple alcoholic neuritis, the committee were strongly of opinion that excessive consumption of beer, if not the exciting cause of the outbreak, was undoubtedly the predisposing cause. Dengue caused only 79 admissions as compared with 282 in the previous year and 415 in 1905. The disease was confined almost entirely to Rangoon and Lucknow. *Bilharzia hæmatobia* has nearly died out among European troops in India. Rheumatic affections, as usual, were responsible for a large number of admissions to hospital (namely, 744), and 30 soldiers were invalided for these diseases. In some remarks upon a trial which was made during the latter part of 1907 of sending invalids and convalescents to Kasauli during the winter months the senior medical officer at that station says that patients suffering from rheumatism in any form did not appear to be benefited by the change.

Tubercle of the lungs.

The total number of cases of tubercle of the lungs treated during the year was 138, and the total deaths were fourteen. The admission rate was the same as in the previous year, but the death rate rose from 1·7 to 2·0 per thousand, and the number of men invalided rose from 92 to 107. The stations from which the largest numbers of admissions were reported were Chakrata, Rawalpindi, Wellington, Dinapore and Meerut, but the number was not more than eight in any station. The death rates from tubercle of the lungs among

European troops, Native troops, and native prisoners during the year were in the proportions of 10, 16, and 150, but the figures are affected, of course, by invaliding.

Pneumonia and other respiratory diseases.

The admission and death rates from pneumonia were 2·8 and ·35 per thousand, respectively, as compared with 3·4 and ·28 in 1906, the total numbers of admissions and deaths in each year being 195 and 24 in 1907 and 241 and 20 in 1906. The disease was slightly more prevalent in the Northern than in the Southern Army, and as regards geographical groups it was most prevalent among troops in groups IV (Bengal-Orissa) and VII (North-West Frontier), and least so among troops in group II (Burma Inland). Compared with the previous year there was an increase in prevalence in three of the geographical groups and a decrease in eight. Excluding stations where the strength was below 200 the highest admission rates for the year were recorded at Dum Dum, Nowshera, Campbellpore, Quetta and Barrackpore. In India as a whole, most cases were recorded during December, and fewest during June and September. There was an increase in the admission rate on account of "other respiratory diseases" from 20·3 per thousand to 21·9, and there were eight deaths from these diseases as compared with six in the previous year. The geographical group in which these diseases were most frequent during the year was VII (North-West Frontier), and the stations (excluding those where the average strength was low) in which the highest admission rates were recorded were Nowshera, Nowgong, Nasirabad, Subathu and Bareilly. Of the eight deaths under this heading, three were due to broncho-pneumonia, two to bronchitis, and one each to asthma, cirrhosis of the lung and empyema.

Dysentery and diarrhœa.

Dysentery was less prevalent among all classes of people in India than in 1906, and the admission and death rates among European troops fell from 15·2 and ·53 per thousand, respectively, to 11·7 and ·33. The disease was more prevalent and fatal in the Southern than in the Northern Army, and as regards Divisions it was most prevalent among troops in the 5th (Mhow), the 9th (Secunderabad), and the 8th (Lucknow) Divisions. The death rates were highest in the Burma and Lucknow Divisions. As regards geographical groups the disease was, as usual, most prevalent in the Deccan group (IX) and most fatal in the Burma Coast group (I). Excluding stations with a strength below 150, the highest admission rates were recorded at Saugor (36·2 per thousand), Barrackpore (35·2), and Madras (28·9). For the European Army as a whole, the months of greatest prevalence were August and May, and those of least prevalence June and January.

There were 1,012 admissions on account of diarrhœa, with no fatality, as compared with 813 admissions and 23 deaths on account of dysentery. The admission rates were highest among troops in groups VII and VIII, and in these groups are included the two stations with the highest ratios, namely, Nasirabad (67·9 per thousand) and Nowshera (62·5).

Hepatic abscess.

Abscess of the liver was also less prevalent during 1907, the number of admissions to hospital being 165 and the deaths 70 as compared with 183 and 107 respectively in the previous year. The disease caused more admissions and deaths among the troops of the Southern than of the Northern Army, and as

regards Divisions the admission rate was highest among troops in the Burma Division and the death rate among troops in the Secunderabad Division. One or more cases occurred in 61 stations, the largest numbers of cases being in Rangoon and Secunderabad (eleven in each). No remarks worthy of note in connexion with this disease are made by medical officers.

Alcoholism.

There were 94 admissions to hospital and seven deaths from alcoholism as compared with 170 admissions and six deaths during 1906, the corresponding average numbers recorded annually during the decennium ending 1906 being 230 and eight respectively.

Venereal diseases.

The recorded admission rate for all venereal diseases in 1907 was 89·9 per thousand, the death rate was ·04 per thousand and the constantly sick rate was 10·6 per thousand. These figures are represented in actual numbers by 6,236 the total admissions, three the total deaths and 735·27 the total number constantly sick throughout the year. The corresponding figures in 1906 were, as regards rates, 117·3 per thousand, ·16 per thousand and 12·3 per thousand, and as regards actual numbers 8,240 the admissions, 11 the deaths and 864·79 the number constantly sick. The fall in the rates relating to these diseases, which is one of the most remarkable features of the health statistics of European troops in India during recent years, is common to all kinds of venereal disease. It is attributed to a number of causes, among which may be mentioned, as being the more important, the efforts of regimental and other officers to occupy the spare time of the men in healthy pastimes, to make the regimental institutes attractive and comfortable, and to influence the men to avoid contracting these diseases; the better education and higher moral tone now existing among soldiers generally; increased knowledge of the dangers of these diseases, leading to greater care as regards personal prophylaxis; less indulgence in alcohol; the more thorough treatment now carried out in all cases. It is noteworthy, of course, that the prevalence of venereal disease among Native troops is also declining rapidly, and this must be attributed in chief part at any rate to a diminution in the number of sources of infection. The indication of the decline in syphilis among European troops afforded by the figures of the "syphilis register" continues to be satisfactory. This register contains the names of all men who come under treatment for syphilis for the first time; it was started in 1904, and in that year the names of 2,947 men were entered upon it. In the next year it contained the names of only 1,470 men, and in the next of only 936 men. In 1907 the names of only 797 men had to be entered on it, so that we may assume that the yearly number of men who contract syphilis is steadily decreasing. Every man whose name is on this register has to attend hospital once a week for observation and treatment during a period of two years, and the continuous improvement in the results of treatment are shown by the steady decrease in the proportion of cases requiring readmission to hospital while under observation. At a conference of selected medical officers recently held at Ambala, a number of practical recommendations were made in connexion with the routine methods of treatment of venereal diseases amongst troops in India, and steps are being taken to carry out the recommendations as far as possible.

The average period of detention in hospital of a patient suffering from any form of venereal disease during 1907 was 43·04 days, and the total loss of

service involved amounted to 268,374 days, the non-efficiency thus reckoned being about four times as much as that incurred on account of enteric fever.

There were only three deaths (·04 per thousand of strength) attributed to venereal diseases during 1907, as compared with eleven (·16 per thousand) in the previous year and thirteen (·18 per thousand) in 1905; and the number of men invalided for this cause was 97 (1·40 per thousand) as compared with 131 (1·86 per thousand) in 1906.

Venereal diseases are always less prevalent among troops serving in the Punjab and neighbouring provinces than among those serving in provinces further south, and in 1907 the admission rate among troops of the Northern Army was only 80·1 per thousand as compared with a rate of 102·7 among troops of the Southern Army. As regards Divisions the admission rates were highest among troops in the 9th (Secunderabad) Division and the 10th (Burma) Division. Excluding stations at which the average strength was below 100, the highest admission rates were recorded as regards the Northern Army at Fort William, Agra and Delhi, and as regards the Southern Army at Madras, St. Thomas's Mount, Meiktila, Wellington, and Bellary.

The admission rate on account of gonorrhœa was 48·0 per thousand of strength, and that on account of soft chancre 19·7 as compared with rates of 61·0 and 28·5 respectively in 1906. Twenty-one men, as compared with eleven in the previous year, were invalided for gonorrhœa during 1907.

Heat-stroke.

The total number of deaths recorded as a result of heat-stroke during 1907 was 26 as compared with 39 in the previous year and 55 in 1905. The stations at which the largest numbers of deaths from this cause occurred were Agra, Allahabad, and Ferozepore.

Suicide.

The average annual number of suicides reported in the decade 1891–1900 was nineteen, and in 1907 the number was seventeen, of which eight were by gunshot, two by cut throat, one by drowning, two by hanging, one by fracture of the skull, one by oxalic acid poisoning, one by opium poisoning and one by taking sulphuric acid.

Invaliding.

From the European Army of India 1,768 men were invalided in 1907 (25·50 per thousand of strength) as compared with 1,993 (28·36 per thousand) in the previous year. In the Northern Army the rate was 22·00 per thousand of strength, and in the Southern Army it was 31·07 per thousand. The chief causes of loss by invaliding have already been mentioned on page , and a striking feature of the statistics is the increase in the number of men invalided for ague. This was doubtless the result of the very malarious autumn of 1906. Of the total number of men invalided from all causes 52 per cent. were under 25 years of age and 86 per cent. under 30 years of age, and as regards length of residence in India 34 per cent. of all invalids had less than two years' service in this country and 74 per cent. less than five years. In August 1907 action was taken to ensure that only those invalids should be sent to England who would not be likely to recover their health by a change to one of the hill stations in India.

Officers.

The average strength of commissioned officers with European troops in India during 1907 was 2,204, and, among them there were 1,396 cases of sickness, 122 were invalided and 17 died during the year. The admission rate, the constantly sick rate, the invaliding rate, and the death rate were each considerably lower than in the previous year, the death rate falling from 17·53 to 7·71 per thousand. The admission rate from venereal disease was the same as in 1906, but the rates from all other diseases were lower. There were only three deaths from enteric fever giving a ratio of 1·36 per thousand against 6·29 in the previous year. There were three cases of plague, with two deaths, but there was no case of cholera. Enteric fever, ague, and debility were the chief causes of invaliding.

Women.

The health of the women was much better than in 1906. The average strength was 3,496, an increase of 65 on that of the previous year, and there were in all 2,299 admissions to hospital and 23 deaths, giving admission and death rates of 657·6 and 6·58 per thousand respectively as compared with rates of 757·8 and 12·24 in 1906. The constantly sick rate was 28·8 per thousand as compared with 32·9. The chief causes of admission to hospital were, as usual, debility, diseases peculiar to women, and ague, which together accounted for 63·64 per cent. of the total number of admissions from all causes. Of the 23 deaths six were due to enteric fever, four to child-birth and abortion, and two to ague.

Children.

The admission, constantly sick, and death rates among the children were all considerably lower than in 1906. The strength was 5,379; the admission rate 368·3 per thousand; the constantly sick rate 15·3, and the death rate 32·72. The chief causes of sickness were diarrhœa, ague, and respiratory diseases, which together accounted for 34 per cent. of the total number of admissions from all causes. Out of the total of 176 deaths 31 were attributed to diarrhœa, 29 to debility and immaturity at birth, 15 to respiratory diseases, 14 to convulsions and nine to teething. There were 32 admissions to hospital with no death from enteric fever, and 237 admissions with 31 deaths from diarrhœa. Among the exanthemata to which children are liable there came under treatment during the year 91 cases of measles, 22 of chicken-pox, 13 of scarlet fever, four of rubella, three of small-pox, and one of cow-pox, there were also 28 cases of whooping cough, seven of mumps and five of diphtheria.

Immaturity at birth was the cause of 27 per cent. of the total number of deaths among children under six months of age.

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Native Troops.

(For Statistical Tables, *see* pages 143 to 146.)

India.

The average strength of the Native troops, including those on duty in China and other stations outside India, was 126,392 as compared with 127,853 in 1906, and their health, as judged by the statistics of sickness and mortality, was good, the constantly sick rate, the invaliding rate, and the death rate being the lowest on record. The statement in the margin enables a comparison to be made at a glance between the rates of sickness, mortality, and invaliding for the year under review, for the previous year and for the quinquennial period from 1901-1905, and it will be seen that the statistics of 1907 are in all respects favourable. As compared with 1906 the reduction in mortality and in invaliding is represented in actual numbers by the fact that there were 47 fewer deaths and 174 fewer invaliddings.

Native troops.	All causes. Ratios per mille.		
	1901-05.	1906.	1907.
Admissions ...	683·6	688·5	688·9
Constantly sick ...	25·8	23·0	21·7
Deaths ...	9·69	6·57	6·27
Invalids ...	11·49	7·05	5·76

It should be noted that the death rate among Native troops is not fairly comparable with that among European troops. Many Native soldiers die while on sick leave at their homes and a number die while on ordinary furlough. If the deaths of men while absent from their regiments were included the death rate among Native troops in 1907 would have been 8·51 per thousand. The death rate of European troops in India is also affected, of course, by invaliding, but the death rate of Native troops is affected to a much greater extent by the factors mentioned above.

The decrease in the rate of admission to hospital was due to the lesser prevalence of ague, the admission rate from which was 220·5 per thousand as compared with 261·8 in 1906; the admission rates from simple continued fever, dysentery, cholera, diarrhœa and venereal diseases were also lower than in that year. Among the more important diseases there was a reduction in the mortality from cholera, tubercle of the lungs and remittent fever, but an increase in the mortality from enteric fever and ague. Typhus fever of which there was only one case in 1906, caused 24 admissions and four deaths in the year under review.

The chief causes of sickness were intermittent fever, dysentery, simple continued fever, "other respiratory diseases," venereal diseases and anæmia and debility, in order of their relative prevalence, intermittent fever accounting for 35 per cent. and dysentery for over 5 per cent. of the total number of admissions from all causes. The principal causes of death were pneumonia, ague, enteric fever and tubercle of the lungs, these diseases accounting respectively for 31·8 per cent., 6·3 per cent., 5·5 per cent. and 5·3 per cent. of the total number of deaths from all causes. Enteric fever has appeared in the list of diseases causing most mortality since 1905. The number of men invalided for discharge from the service was 728 as compared with 902 in 1906, the chief causes of this source of loss being tubercle of the lungs, debility, rheumatism, venereal diseases, and intermittent fever.

If table XI be compared with table II it will be seen that the Native troops suffered less than the European troops from influenza, small-pox, enteric fever, simple continued fever, diarrhœa, hepatic affections, and venereal diseases, but that they suffered more from each of the other causes of sickness tabulated.

The statistics of Native troops located in stations outside India will be found in Tables XXVIII and XXIX of the Sanitary Commissioner's annual report for 1907 and the following summary contains such details only as are not given in those tables. The average strength of the troops serving in North China was 1,553, the rate of admission to hospital was 301 per thousand and the death rate was 3·86 per thousand. Tubercle of the lungs, influenza and "other respiratory diseases" were the chief causes of sickness, the admission rate from tubercle of the lungs being 27·0 per thousand and the death rate 1·29 per thousand. The average strength of the troops in Colombo and Singapore was 1,483, the admission rate was 448 per thousand and the death rate 4·05. Anæmia and debility was the chief cause of sickness, and circulatory diseases and tubercle of the lungs were the chief causes of death. In the stations of the Aden Brigade (Aden, Khormaksar, Sheikh Othman and Perim) the average strength was 1,058, the admission rate was 968 per thousand and the death rate was 10·40 per thousand, ague and dysentery being the chief causes of sickness and tubercle of the lungs the chief cause of death. The average strength of troops in the Aden Hinterland was 224, and over 61 per cent. of the total admissions to hospital were due to ague. In stations on the Persian Gulf the average strength was 227, 50 per cent. of the total admissions to hospital being due to ague and about 19 per cent. to dysentery. There was no Native regiment stationed in Mauritius during the year.

Northern and Southern Armies. Divisions.

The change in the headings under which the tabular abstracts are arranged this year has already been referred to in the Section relating to European troops and for Native as well as for European troops the statistics have been worked out as if the change had come into force on the 1st of January 1906. It will be seen that among Native troops there was more ill-health among troops of the Northern than of the Southern Army, which is the reverse of what was found to be the case among European troops. The statistics at the end of Table XXVIII of the Sanitary Commissioner's annual report for 1907 show that in 1907 malarial fevers, tubercle of the lungs, pneumonia, "other respiratory diseases" and anæmia and debility were the diseases which caused the admission rate among troops of the Northern Army to be higher than that among those of the Southern Army; nearly all the other chief diseases were less prevalent in the Northern Army. The relative incidence of different diseases on the European and Native troops of the two armies corresponded as regards all the chief diseases except influenza, cholera, small-pox, enteric and remittent fevers. As regards the Divisions, the statistics of troops in the 1st (Peshawar) Division were the least favourable during 1907, and it will be remembered that the same was found to be the case for European troops. For Native troops, however, the 2nd (Rawalpindi) Division stands next in the list and the 4th (Quetta) Division third.

Geographical groups.

For the year under review groups VII (North-West Frontier), X (Western Coast) and IV (Bengal-Orissa) must be considered to have been most unhealthy for Native troops, and as regards groups IV and VII this is in accordance with general

experience. Ague was most prevalent in the North-West Frontier and Bengal-Orissa groups, pneumonia in the North-West Frontier group and tubercle of the lungs and dysentery in the Western Coast group. The highest death rates were recorded in groups VII where the mortality was due chiefly to pneumonia, and XII (Hill stations), where it was due chiefly to pnuemonia and malarial fevers.

Stations.

In 1907 there were 39 stations in which the average strength of Native troops was over one thousand, but in only four of these, namely, Hong Kong, Dera Ismail Khan, Dehra Dun, and Abbottabad, were the admission and death rates very high. In Dera Ismail Khan the admission rate was 1363·4 per thousand and the death rate 11·53 per thousand, the chief causes of the large amount of sickness being malaria, dysentery, and "other respiratory diseases." In Dehra Dun the admission rate was 1,173·4 and the death rate 9·63 per thousand; of the 2,923 admissions to hospital recorded at this station 1,970 were due to intermittent and simple continued fevers. The admission and death rates at Abbottabad were 951·8 and 10·74 per thousand, respectively, the chief causes of sickness being ague, "other respiratory diseases" and dysentery. Full abstracts of the cantonment sanitary reports upon these and 26 other of the most unhealthy stations will be found in Table XXX of the Sanitary Commissioner's annual report for 1907, so it is unnecessary to refer to them in detail here. Among regiments with a record of much sickness and mortality during the year were the 94th Russell's Infantry at Fort Sandeman, the 7th Rajputs at the Malakand, the 128th Pioneers at Quetta, the 67th Punjabis at Kohat and the 69th Punjabis at Dera Ismail Khan. The admission rates in these regiments ranged between 689 and 1,327 per thousand, and the death rates between 16·26 and 42·44 per thousand, and in all of them, except the 128th Pioneers, ague, bowel complaints and pneumonia were the chief causes of sickness. In the 128th Pioneers ague, scurvy, and influenza were the chief causes.

Influenza.

Influenza was less prevalent among Native than among European troops, but the rate of admission to hospital rose from 5·2 per thousand in 1906 to 6·5 per thousand. The largest numbers of cases recorded among Native troops in the different stations were 265 at Quetta, 92 at Ferozepore, 51 at Edwardesabad and 48 at Peshawar. The disease was most prevalent at Quetta during September and October, at Ferozepore during November, at Edwardesabad during May and June and at Peshawar during January.

Cholera.

There was a considerable decrease in the prevalence of cholera among Native troops, 34 cases and 24 deaths being reported as compared with 94 cases and 62 deaths in 1906. The disease was less prevalent and widespread among the general population of the country, and as regards the Native troops the diminished incidence is shown by the fact that a case or cases occurred in only thirteen regiments as compared with 32 in the previous year. In nine regiments only one case occurred, in two regiments only two cases, in one regiment (the 88th Carnatic Infantry) five cases and in one regiment (the 113th Mahrattas) sixteen cases. The last-named regiment was stationed at Kampti. The outbreak began in the right wing of the regiment on October 16th, the probable cause being said to be the pollution of a

well. The wing was moved into camp on the 20th and the outbreak ceased. On the 23rd, however, cases began to occur in the left wing which had remained in the cantonment. In this instance polluted milk was said to be the cause. The wing was moved into camp on the 24th, and this measure together with the other precautions taken prevented the disease from becoming epidemic.

Small-pox.

There were 48 admissions to hospital and five deaths from small-pox during the year as compared with 79 admissions and four deaths in 1906. The rates per thousand of strength were ·4 and ·04 respectively, the former being equal to and the latter higher than the corresponding rates among European troops. A case or cases occurred in 33 regiments, but there was only one case in 24 regiments and there were only two in six. The largest numbers in any regiment were five in the 83rd Light Infantry at Bangalore and four in the 74th Punjabis at Saugor.

Ague remittent fever, simple continued fever.

Intermittent fever accounted for over 35 per cent. of the total number of admissions from all causes, but the admission rate fell from 262 per thousand in 1906 to 220. The disease was considerably more prevalent in the Northern than in the Southern army, and this may always be expected. The admission rates recorded in all but three of the twelve geographical groups were lower than in 1906, the three exceptions being Burma Coast (I) Assam (III) and Bengal-Orissa (IV). For the whole Native Army the months of greatest prevalence were, as usual, October and November, and this applies also in all the geographical groups except I (Burma Coast) in which most cases occurred during May, and II (Burma Inland) in which most cases occurred during July. Among stations where the average strength was over 150 those at which the highest admission rates were recorded were Dera Ismail Khan (734 per thousand) Dehra Dun (694), Edwardesabad (693), Baroda (647), Fort Sandeman (638), Alipore (629) and Jandola (595). In seven other stations the admission rate was over 450 per thousand of strength. As regards the prevalence of the disease in stations outside India, the admission rate recorded among the Native troops in South China (Hong Kong) was 574 per thousand, but among those in North China (Tientsin, Lutai, Shan-hai-Kwan and Tongshan) it was only 18 per thousand; the rate among troops in Colombo and Singapore was also very low. Among troops in stations on the Persian Gulf the rate was 176 per thousand, and among those in the Aden Hinterland it was 536 per thousand. In Chumbi and Gyantse (Tibet) the rate was very low. Dera Ismail Khan was garrisoned during the year by the 29th Mountain Battery, the 16th Cavalry, the 20th Infantry and the 26th and 69th Punjabis, the average annual strength of the Native troops being 2,342. The admission rates from intermittent fever in these regiments ranged between 494 and 1,194 per thousand, but they were considerably lower than in 1906. The decrease is attributed to the exceptional dryness of the year. The 1-9th, 2-9th, and 2-2nd Gurkha Rifles were at Dehra Dun throughout the year, the admission rates from ague in these regiments ranging between 349 and 1,127 per thousand. It is said that at this station the autumn was very unhealthy. Edwardesabad was garrisoned by the 24th Hazara Mountain Battery, the 17th Cavalry, the 51st Sikhs and the 31st Punjabis. The high admission rates for malaria in these regiments were attributed chiefly to relapses of infections contracted in the previous year. As regards the prevalence of the disease in the regiments at Hong Kong it is said that most of the patients were infected while in camp and not while in the

barracks at Kowloon, where, according to the report of the Medical Officer of the 129th Baluchis, *anopheline* mosquitoes are rarely seen.

The number of admissions to hospital recorded as due to remittent fever was 567 and the number of deaths was 34, the rates per thousand of strength being 4·5 and ·26 respectively as compared with 5·0 and ·34 in 1906. In twenty-four stations only one case was recorded and in sixty-eight stations the number did not exceed ten. The stations at which most cases were recorded were Nowshera (76), Bakloh (44), Jullundur (38), and Hong Kong (34). In these stations it is probable that all or nearly all the cases were due to malarial fever, but a careful examination of the reports of a number of fatal cases occurring among Native soldiers and prisoners show that at least a few cases are in all probability due to a class of fevers as yet undifferentiated.

The statement in the margin gives the statistics of simple continued fever among Native troops for the last five years. The great increase in the number of cases since 1904 is doubtless due to the greater care now taken in the diagnosis of cases in which fever is the most obvious symptom, and especially to the practice of not diagnosing a case as ague unless the clinical signs are typical or unless malaria parasites are found in the blood of the patient. The statistics from 1905 to 1907 when considered along with the statistics of intermittent fever seem to indicate that in the endeavour to exclude malaria as a cause of cases of fever negative results of microscopic examinations of the blood have perhaps been relied upon too strictly. The largest number of cases in any regiment were recorded in the 2-2nd Gurkha Rifles at Dehra Dun, and the Medical Officer of this regiment expresses the opinion that many of the cases were really malarial fever, although from their short duration and from the negative results of a blood examination they were recorded under the heading simple continued fever. There were two deaths recorded as due to this disease during the year, but an examination of the case-sheets shows that in both cases the diagnosis was obviously at fault.

SIMPLE CONTINUED FEVER. NATIVE TROOPS.

Years.	Total admissions.	Admission rate per 1,000.
1903 ...	441	3·5
1904 ...	829	6·7
1905 ...	1,768	14·3
1906 ...	3,783	29·6
1907 ...	2,094	16·6

Kala Azar.

There were twelve cases diagnosed as *kala azar* during the year as compared with ten in 1906. They occurred in the following regiments and stations: four in the 2-6th Gurkha Rifles at Abbottabad, four in the 1-2nd Gurkha Rifles, two in the 2-2nd Gurkha Rifles, one in the 1-9th Gurkha Rifles, all at Dehra Dun, and one in the 13th Rajputs at Alipore. Five of the patients died. The diagnosis was confirmed in all cases by finding the Leishman-Donovan parasites in blood obtained by splenic or hepatic puncture, or, as in one fatal case at Abbottabad and in the fatal case at Alipore, by finding them in smears made from the spleen after death. From the reports made by Medical Officers on these cases it appears probable that in some, if not in all, the disease was contracted not in the station where the patients were admitted into hospital, but during the time they were absent on furlough at their homes, and as regards some of the cases in Gurkha sepoys it was clearly shown that the infection was contracted in Nepal.

Typhus fever.

Typhus fever, although very common in the Jails of India from 1873 to 1893 has always been rare among Native troops, only sixteen cases with four deaths having been recorded among them during the 35 years from 1868 to 1902. From 1892 to 1902 no case occurred, but in 1903 there were recorded nineteen cases with four deaths. The next year there was again no case, but in 1905 there was one, in 1906 one, and in 1907 there were no fewer than 24 with four deaths. In the jails of India no case has occurred since 1901. The cases among Native troops during 1907 were recorded in the following regiments and stations: eighteen (with three deaths) in the 59th Scinde Rifles, two in the 57th Rifles and three (with one death) in the 1st Sappers and Miners, all at Peshawar, and one in the 28th Mountain Battery at Abbottabad. In addition there were many cases at Peshawar among Mule Corps drivers and followers, the Divisional Sanitary Officer reporting altogether 120 cases with 25 deaths at that station. As regards the origin of the epidemic, it is said in the first place to be well known that typhus fever is endemic among the population in villages round Peshawar, and that this being so it is not surprising that cases should occur among Mule Corps drivers and followers who, when on manœuvres, are not under such strict supervision as the troops. During the early weeks of February pneumonia of a virulent type was prevalent among men of the Mule Corps, and because the cantonment hospital, where such followers are treated, was full, some of the patients had to be admitted into the regimental hospitals of the 59th Scinde Rifles and the Sappers and Miners. The possibility that the disease might be typhus fever was not at first thought of, especially as a well-marked rash appeared in only a few cases and in others the rash was not easy to detect on the dark skin. In the 59th Rifles the first cases were either patients who were in hospital for other diseases or attendants on patients who were suffering from the type of pneumonia already mentioned. This led to a more minute investigation, and the true nature of the disease was quickly discovered. The Medical Officer of the 57th Rifles considers that the disease is much more common in India than is generally supposed, being diagnosed often as pneumonia, "epidemic pneumonia" or remittent fever. He enumerates the chief diagnostic symptoms as follows: (1) a marked degree of mental apathy, sometimes amounting to coma; (2) extreme dryness and foulness of the tongue after the second or third day; (3) great prostration at the beginning of the illness; (4) termination of the fever by crisis on the 13th to the 16th day; (5) the characteristic rash which usually appears on the fifth day is present in only about one-third of the cases, and is sometimes faint.

Relapsing fever.

Relapsing fever, which had caused 31 admissions and five deaths in 1906 caused 26 admissions and three deaths in 1907. There were seven cases with three deaths in the 29th Lancers at Sirur, seven cases, none of which was fatal, in the 128th Pioneers at Quetta, five cases (none fatal) in the 107th Pioneers at Kirkee, four (none fatal) in the 33rd Light Cavalry at Secunderabad and one non-fatal case in the 109th Infantry at Santa Cruz, the 39th Central India Horse at Goona and the 110th Light Infantry at Ahmednagar. The Medical Officer of the 29th Lancers states that the disease is endemic at Sirur, and that outbreaks, which usually last from two to four months, occur at irregular intervals. The Medical Officer of the 33rd Light Cavalry states that the source of infection in the first case which occurred in that regiment was not discovered, but that the three other patients became infected while acting as nursing attendants in the hospital where

the first patient was being treated. The diagnosis was confirmed in all cases by finding the relapsing fever *spirillum* in the blood. Sergent and Foley report that they have confirmed Mackie's observation that the disease can be communicated by blood-sucking lice.

Enteric fever.

The table in the margin shows that the number of cases diagnosed as enteric fever in the Native army has increased considerably during recent years. The increase is due not to the appearance of the disease in epidemic form among the Native troops in any regiment or station, but to the occurrence of one or two cases in a much larger number of regiments than in former years. Thus the 182 attacks recorded in 1907, comprised cases from no fewer than 84 regiments located in as many as 53 stations; and in 44 of the regiments only one case was recorded, in twenty only two cases and in ten only three, so that we are left with only ten regiments in which more than three cases occurred during the year. These figures serve as evidence in favour of the common observation in India, that enteric fever does not occur in epidemic form among Native troops and, when compared with the figures of previous years, they tend to show also that very probably the recorded increase in the number of cases is due not to a greater prevalence of the disease in the Native army but to the more general application of bacteriological methods of diagnosis. An examination of the medical case-sheets shows that in by far the greater number of cases during 1907 the diagnosis was made on the results of such methods of diagnosis, not by the clinical symptoms and signs; indeed, in many cases the clinical signs were in no respect typical of the disease as it occurs among European soldiers, and medical officers report that had a positive result with the agglutination test not been obtained such cases would have been recorded as simple continued fever. The records of 116 cases in which this test was carried out have been examined; they show that a positive result in dilutions ranging in different cases between 1 in 40 and 1 in 200 was obtained in 100 of these cases. In addition it is noteworthy that in at least five of the cases which occurred during the year the *Bacillus typhosus* was isolated either from the peripheral blood or from the fæces or urine. In one case in the 114th Mahrattas at Poona the bacillus was repeatedly isolated from the urine and on one or two occasions in enormous numbers, yet with the exception of a continued type of fever and a loss of weight of five pounds in three weeks there was no symptom suggestive of enteric fever. In another case in the same regiment the bacillus was isolated from the fæces but the symptoms were even less marked than in the first case. It appears from a consideration of these cases and of others which occurred during the year that we must accept as correct the view that natives as well as Europeans may be excreting the bacilli in large numbers in their fæces or urine without presenting characteristic symptoms of enteric fever; whether we believe that natives become infected from Europeans or Europeans from natives the fact affords an additional argument for the more complete segregation of the troops from the general population of the country. The source of infection was not discovered in any case which occurred among Native troops during the year, and although the Native soldiers who act as nursing attendants upon patients

Enteric fever. Native troops.		
Years.	Total admissions.	Admission rate per 1,000.
1902	50	·4
1903	80	·6
1904	70	·6
1905	130	1·1
1906	127	1·0
1907	182	1·4

suffering from the disease do not in all probability take very careful precautions to avoid infection it appears that no case occurred among them.

It is interesting that a case or cases were reported to have occurred in 29 stations in which either no case occurred among the European troops or in which no European troops were stationed during the year.

Malta fever.

The number of cases recorded as due to Malta fever has also increased considerably during recent years as will be seen from the marginal statement. Of the 62 attacks recorded in 1907, no fewer than 30 occurred in Rawalpindi, namely, 28 in the 36th Sikhs and 2 in the 25th Punjabis. In this station no case was recorded until July; there were six cases during that month, twelve during August, nine during September, two during October and one during December. Of the remaining 32 cases recorded in the Native army during the year seven occurred in the 29th Punjabis at Jullundur, four in the 34th Sikh Pioneers at Lahore, four in the 51st Sikhs at Bannu, three in the 32nd Sikh Pioneers at Ambala, three in the 19th Punjabis at Jullundur, two in the 12th Cavalry at Multan, two in the 36th Jacob's Horse at Ambala and one in each of seven different regiments at Meerut, Kohat, Secunderabad, Fort Sandeman, Fyzabad, Sialkot and Bannu. It is worthy of note that several regiments in which a number of cases were recorded in 1906 had no case during 1907, and it may be hoped that this was due to the careful supervision exercised over the milk supply and to the exclusion from the regimental lines of all goats suspected to be harbouring the *Micrococcus melitensis*. The results obtained in Malta prove that the complete prevention of the disease among European troops can be ensured, and although greater difficulties may be met with in its prevention among Native troops the results already obtained in some regiments in India show that the difficulties are very far from being insuperable. Investigation has shown that in India as in Malta the consumption of unboiled goats' milk is in all probability the usual way in which infection is contracted, and that it is not difficult by means of the serum test to identify all goats which harbour the *Micrococcus*. An interesting paper, in which is given the results of this test with the blood of 39 goats from the herd which supplied milk to the 36th Sikhs, was published by Captain Brayne, I.M.S., in December 1907. The tests were carried out at the Pasteur Institute, Kasauli. It was found that the blood serum of eleven of the goats agglutinated the *Micrococcus melitensis* in a dilution of at the lowest 1 in 20 and from the blood of one out of two goats which were sent to the institute for examination the *Micrococcus* was isolated on five separate occasions. The paper also contains an account of the signs and symptoms in 26 cases which occurred among Native soldiers in Rawalpindi, from which it appears that it would be difficult or impossible to diagnose some cases of the disease as Malta fever without the help afforded by the agglutination test.

Malta fever. Native troops.

Years	Total admissions.	Total deaths.
1902	4	...
1903	8	...
1904	5	1
1905	43	1
1906	38	1
1907	62	2

Plague.

Although plague was much more prevalent among the general population in many parts of India than in 1906 the number of cases among Native troops was only 85 as compared with 147 in that year and the number of deaths only 56 as compared

with 83. Out of the total of 156 stations occupied by Native troops during 1907 about 99 were in districts where plague was prevalent among the general population, yet in only 33 of these did cases occur among the troops. The largest number of admissions at any station was nine at Nowshera, five of the cases occurring in the 45th Sikhs, two in the 28th Punjabis, one in the 23rd Cavalry and one in the 54th Sikhs. Other stations where more than a very few cases occurred were Ambala in which there were eight cases in the 8th Cavalry and 32nd Sikh Pioneers, Lahore Cantonment and Ferozepore, in each of which seven cases occurred, distributed among men of the 25th Cavalry, the 38th Dogras and the 15th and 14th Sikhs, and Sialkot in which six cases were distributed among men in the 15th and 32nd Lancers and the 23rd Sikh Pioneers. In no other station were more than five cases reported, and in sixteen stations and thirty-four regiments only one case occurred.

Scurvy.

The total number of admissions to hospital on account of scurvy during 1907 was 286, which gives a ratio of 2·3 per thousand as compared with a ratio of 2·4 per thousand in the previous year. About 52 per cent. of the admissions in 1907 were recorded among troops in the Southern army and about 21 per cent. among troops in the Northern army; and as regards geographical groups over 18 per cent. of the admissions occurred among troops in group XII (Hill stations) and about 13 per cent. among troops in group VIII (Central India). The largest numbers of cases were recorded in the 128th Pioneers (63 admissions to hospital and 14 deaths), the 127th Baluch Infantry (24 admissions), the 109th Infantry (22 admissions), the 120th Infantry (21 admissions) and the 116th Mahrattas (16 admissions and one death). The head-quarters of the 128th Pioneers was at Quetta, but 51 of the cases occurred among men of the detachment at Robat, being due, it is said, to the absence of fresh vegetables and to the difficulty of sending men on sick leave. Only two of the deaths from this disease occurred at Quetta. The 127th Baluchis were also stationed at Quetta and provided a detachment for Robat where most of the cases of scurvy occurred. The 109th Infantry was located in Santa Cruz (Bombay) where, it is said, fresh vegetables, meat and milk are expensive. In the 120th Infantry nearly all the cases occurred among newly-enlisted men. The 116th Mahrattas were at Aden until October and all the cases occurred there.

Tubercle of the lungs.

The admission rate on account of tubercle of the lungs was the same as in 1906, namely, 2·5 per thousand, but the death rate fell from ·52 per thousand to ·33, the total numbers of admissions and deaths being 324 and 67 in 1906 and 322 and 42 in 1907. Among Gurkhas there were 62 cases and 14 deaths as compared with 63 cases and 29 deaths in the previous year. The disease was, as usual, much more prevalent among this class of the Native troops than among other classes, the admission and death rates for the Native army, excluding Gurkhas being 2·3 and ·24 per thousand, respectively, and for Gurkhas 4·8 and 1·03. That the greater prevalence among this class of men is not due to the climatic conditions of the stations where they are located is shown by the fact that on an average strength of 6,535 Native troops of other classes located during 1907 in the Gurkha stations the admission rate from tubercle of the lungs was only 1·2 per thousand and no death occurred. The disease is also very prevalent among Dogras and in 1907 the largest number of admissions (33) in any regiment occurred in the 41st Dogras who were stationed at Shan-hai-Kwan and

Tongshan in North China. The unsatisfactory housing arrangements for the troops in these stations were referred to in last report, but on the 1st of September 1907 the old barracks were given up and the troops are now quartered in well lighted, amply ventilated, and adequately warmed barracks of a size sufficient to prevent any overcrowding and situated on the sea coast, so it may be hoped that the prevalence of tubercular diseases will diminish. That the severity of the winter is not the chief reason for the great prevalence of the disease is shown by the fact that in the 47th Sikhs who were quartered in good barracks in Tientsin only eight cases of tubercle of the lungs occurred during the year. Among regiments located in India the largest numbers of admissions were recorded in the 2-5th Gurkhas at Abbottabad (10) and in the 2-1st, 1-9th and 2-9th Gurkha Rifles at Dharmsala and Dehra Dun (8 in each). The medical officer of the 2-5th Gurkhas states that owing to the barracks having been overcrowded the regiment was at one time badly affected with phthisis. New barracks are now being built, and while they are being got ready overcrowding is prevented by accommodating a number of men in tents. All men in the regiment are examined frequently, and anyone found to be suffering from tubercle is invalided at once. The barracks are disinfected with perchloride of mercury once a fortnight. It is stated that as a result of these measures no case of tubercle occurred in the regiment after July.

Pneumonia and other respiratory diseases.

The admission rate on account of pneumonia was 12·4 per thousand and the death rate 1·99 as compared with rates of 9·0 and 1·56 per thousand, respectively, in 1906. The disease was more prevalent than in the previous year in nine of the twelve geographical groups, the increase being greatest in the North-West Frontier group (VII), where the admission rate rose from 10·0 in 1906 to 23·0 in 1907. The months of greatest prevalence were, as usual, January, February, March, November and December. Among stations where the average strength was over 100 the highest admission rates were recorded in Fort Sandeman (59·5 per thousand) and at the Malakand (53·2) and as regards regiments the highest rates were recorded in the 7th Rajputs at the Malakand, the 106th Hazara Pioneers at Quetta, the 56th Punjabis at Fort Lockhart and the 1-2nd Gurkha Rifles at Dehra Dun. Nearly all the stations just mentioned are hill stations less than 5,000 feet above sea level. It will be seen from Table XIII that the statistics of Native troops in hill stations below this height are always unfavourable.

Other respiratory diseases were most prevalent during the year in the Northern army and in groups III (Assam), X (Western Coast), VII (North-West Frontier) and IV (Bengal-Orissa). For the whole Native army the admission and death rates from these diseases were 26·5 and ·20 per thousand as compared with 22·9 and ·13 in 1906. Omitting stations where the average strength was less than 100 the highest admission rates were recorded at Hong Kong (113 per thousand) Dibrugarh (93), Buxa (88), Santa Cruz (87) and Peshawar (80), and among regiments the highest numbers of admissions occurred in the 129th Baluchis at Hong Kong, the 53rd Sikhs at Peshawar, the 3rd Sappers and Miners at Kirkee and the 1-6th Gurkha Rifles at Abbottabad. There were in all twenty-five deaths ascribed to these diseases, of which eleven were due to bronchitis, four to pleurisy, four to broncho-pneumonia, three to empyema and one each to laryngitis, non-tubercular phthisis and œdema of the glottis.

Dysentery and diarrhœa.

Dysentery was less prevalent than in the previous year, but the number of deaths was nearly the same. The stations where the disease caused the highest admission rates during the year were Aden, the Malakand, Santa Cruz, Barrackpore, and Fort Sandeman. The medical officer of the 127th Baluchis, in which regiment the disease, although of a mild type, was most prevalent, considered that the quality of the water was the chief cause. He found that it contained large quantities of inorganic salts and that it was polluted with organic matter.

There were in all 859 admissions to hospital and two deaths from diarrhœa as compared with 926 and 10 in 1906. The regiments in which most cases occurred were the 113th Infantry, the 129th Baluchis, the 119th Infantry and the 94th Russell's Infantry. The 113th Infantry was transferred from Aden to Bombay in October and the medical officer considered that the change from the dry heat of Aden to the moist climate of Bombay was chiefly responsible for the prevalence of the disease. In Aden also the supply of pure drinking water is limited and perhaps the men are not sufficiently careful to use only this water for drinking and cooking purposes.

Venereal diseases.

The statement in the margin shows that while the admission rates from venereal diseases among both Native and European troops have decreased steadily during recent years the decrease among Native troops has not been so marked as among European troops. It shows also that, as judged by the statistics of the year, venereal diseases were about six times as prevalent among the European as among the Native troops during 1907. When the total figures are referred to (Tables IV and XXIX of the Sanitary Commissioner's annual report for 1907), it is seen that while among European troops an annual average strength of 69,332 gave 6,236 admissions from venereal diseases, in the case of Native troops an annual average strength of 126,392 gave only 1,864 admissions. The numbers of deaths and invalidings among Native troops have also decreased during recent years; in 1907 there were 2 deaths and 47 invalidings as compared with 8 and 55 in 1906, 7 and 79 in 1905 and 6 and 107 in 1904. The diseases are always less prevalent among both European and Native troops located in the Punjab than in other parts of India, and in 1907 the admission rate among Native troops in the Northern army was 12·8 per thousand as compared with a rate of 18·3 per thousand in the Southern army. The greater incidence of the disease among Gurkhas than among men of other classes was not so marked as usual in 1907, the admission rate among Gurkhas being only 20 per thousand as compared with a rate of 14 per thousand among the remainder of the troops. Excluding stations at which the average strength was less than 100 the highest admission rates among Native troops in the Northern army were recorded at Almora, Manipur, Fort William, Chumbi and Dehra Dun, and among troops

Years.	Venereal diseases, admission rates per 1,000.	
	Native Troops.	European Troops.
1903	24·5	247·0
1904	20·6	198·5
1905	19·5	153·7
1906	16·2	117·3
1907	14·7	89·9

in the Southern army at Nowgong, Bellary, Belgaum, Madras and Ahmednagar. Among all the Native troops in India the admission rate for syphilis was 4·9 per thousand, for soft chancre it was 4·0 per thousand, and for gonorrhœa it was 5·8 per thousand as compared respectively with the figures 5·3, 4·6 and 6·2 in 1906.

Beri beri.

There were only seven admissions to hospital and there was no death from beri beri during 1907 as compared with 41 admissions and 3 deaths in the previous year. Six of the cases occurred in the 81st Pioneers, stationed in Aden and the Aden Hinterland, the remaining case occurring in the 63rd Palamcottah Light Infantry at Fort William. The medical officer of the 81st Pioneers states that all the cases in that regiment were of the "dry" variety and of a mild type.

Guinea worm.

There were 472 admissions to hospital for guinea worm as compared with 500 in 1906 and 609 in 1905. As usual the largest number of cases occurred in group VIII (Central India) and as regards stations at Kherwara, where the Meywar Bhil Corps was stationed, the number of cases in this regiment during the year amounting to 52 or a ratio of 86·1 per thousand of strength.

Suicide.

During the ten years 1897 to 1906 there were altogether 137 cases of suicide, an average of about 14 per annum. There were only nine in 1907, of which seven were by gunshot, one by opium poisoning and one by drowning.

Jails of India.

(For Statistical Tables, *see* pages 147 to 149)

India.

The record of the health of prisoners in Indian jails is one of consistent progress; while the death rates among the general population are rising those among the prisoners are falling, and although the rates among both classes of people fluctuate from year to year the fluctuations in the jail death rates are becoming less frequent and less marked. The rates are falling more steadily than formerly, and it is justifiable to say that this is because in jails the arrangements for counteracting the influences of adverse climatic conditions and for preventing the spread of communicable diseases are improving every year. There is no doubt that at the present time prisoners in Indian jails live under conditions which in nearly all respects are very favourable to health; cholera and plague, the scourges of the general population, scarcely affect the prison statistics, and in preventing the spread of other communicable diseases medical officers have attained a high degree of success. The best methods for the prophylaxis of nearly all such diseases are well known in jails and, if adequate appliances are forthcoming, every year should show advance in this important matter. To counteract the influences of climatic conditions which cause the admission into jail of large numbers of famine-stricken, weakly, and unhealthy prisoners is a task of great difficulty, especially because the population of the jails is ever changing and because in times of hardship many old and infirm persons seek a place of refuge in the jails. The influence of such conditions must always be, to a great extent, unavoidable, and it is the factor which often defeats the efforts of the most resourceful medical officer.

The climatic conditions of 1907 were abnormal and in most provinces were unfavourable to prosperity, which in India is a factor of much importance in connexion with health. January was a very dry month but during February, March, and April the rainfall on the plains was far in excess of the normal and caused much damage to the *rabi* crops especially in the Punjab and Bengal; the monsoon rains arrived late, were persistently feeble except for a brief period, chiefly in August, and withdrew extremely early, thus affecting very injuriously the *kharif* crops in most provinces; the months of October, November, and December were unusually dry. Especially during the latter part of the year the prices of food grains were everywhere higher than normal, and conditions of scarcity were felt in a number of districts. Except in Bengal and Lower Burma cholera was less prevalent than in 1906 but plague has never been so widespread or severe. Neglecting the prevalence of these diseases, from which the prisoners in jails are almost free, and apart from conditions which led to scarcity, the year was not an unhealthy one and in most provinces the unusual dryness tended to diminish the number of cases of malaria and dysentery.

The health of the prisoners was good and the death rate on an average daily population of 107,675 (or 2,407 less than in 1906) was only 18·51 per thousand, which is the lowest rate ever recorded. In these figures the statistics of convicts in the Andaman islands (where the average strength was 14,411) are included but as the convicts in these islands live under conditions which differ considerably from those in Indian prisons it is advisable to consider the statistics separately.

In the jails of India and Burma the average daily number of prisoners of all classes (convicts, under-trial and civil prisoners) was 93,264 or 2,130 less than in 1906, the rate of admission to hospital was 624 per thousand compared with 658 in that year and the death rate was 17·72 per thousand compared with 19·27. Details of the rates recorded in the different administrations are given in later paragraphs but it is worthy of note here that only in the Punjab, Bombay and the Central Provinces were the death rates higher than in 1906 and that in Burma the exceedingly low rate of 11·88 per thousand was recorded. Some statistics relating to convicts separately will be found in appendices F. and G. of the Sanitary Commissioner's Annual Report for 1907 in which are given the admission and death rates among convicts in central and district jails respectively in the different provinces, and the death rates among convicts, arranged according to duration of confinement.

The following remarks relate to the statistics of prisoners of all classes.

Causes of sickness and mortality.

The diseases which caused the highest admission rates were intermittent fever, dysentery, abscesses, ulcers and boils, and diarrhœa; and the most common causes of death were dysentery, tubercle of the lungs, and pneumonia.

Intermittent fever.

The early cessation of the monsoon and the dryness of the autumn months prevented the year from being very malarious. The total number of admissions into hospital on account of intermittent fever was 17,741 or 2,024 less than in 1906, and the admission rate was 190·2 per thousand compared with 207·2 in that year. With the exception of the rate recorded in 1905 (181·7 per thousand) the admission rate in 1907 was the lowest on record. The number of deaths recorded from this disease was 74 as compared with 72 in 1906 and 84 in 1905, the death rate being ·79 per thousand as compared with rates of ·75 and ·91 in 1906 and 1905 respectively. Until July the disease was more prevalent than in the previous year, but the autumnal rise in the number of cases was not nearly so marked as usual. The highest admission rate, 430·3 per thousand, was recorded in the North-West Frontier Province, but in this province no death from the disease occurred. The admission rates in Burma and Madras were only 36·4 and 57·2 per thousand respectively; in other provinces they ranged from 344·7 in Bengal to 157·1 in the Central Provinces. The highest death rate (2·33 per thousand) was recorded as usual in Eastern Bengal and Assam, and the next highest (·98) in Madras. In both these provinces the case mortality also is usually much higher than in others; during the five years ending with 1907 it was about seven per thousand in Eastern Bengal and Assam, and about eleven per thousand in Madras as compared, for example, with a case mortality per thousand of about one in the North-West Frontier Province and about 1·6 in the Punjab, both of which are provinces where the disease is very prevalent. Possibly the explanation lies in the fact that in Eastern Bengal and Assam and in Madras the fatal disease called kala azar, which is not infrequently diagnosed as intermittent fever, is prevalent. The microscope is now used as an aid to diagnosis in a large number of jails, and doubtless the diagnosis of cases in which fever is the most obvious symptom is made with much greater care than formerly, but that there is still room for improvement is shown by an examination of the *post-mortem* records, which indicate that during 1907 cases of pneumonia, bronchitis, tubercle of the lungs, dysentery, ulceration of the intestines, cirrhosis of the liver, chronic Bright's disease, meningitis, and kala azar were diagnosed as "ague".

Remittent fever.

The number of cases of remittent fever recorded during 1907 was only one hundred, which is less than in any previous year, and the death rate was only ·15 per thousand as compared with ·21 in 1906 and ·28 the mean ratio of the five-year period from 1901-1905. The monthly incidence varies from year to year, but it is usually different from that of intermittent fever; during 1907 the largest numbers of cases occurred during July and August. The North-West Frontier Province, where intermittent fever was most prevalent, was the only one in which no case of remittent fever was recorded. One or more cases of the disease occurred in 33 jails, but in only one jail (Cuttack) were more than twenty cases recorded; in the great majority the number did not exceed two. It appears that while a few medical officers use the heading for cases of malarial fever in which the temperature is remittent instead of intermittent, the greater number use it only for cases of fever the nature of which is not wholly clear. In the statistical returns for 1908 and future years such cases will be included, in accordance with the instructions in the new edition of the Nomenclature of Diseases, under the heading "Pyrexia of uncertain origin." The *post-mortem* reports on fatal cases show that in more than one instance all the more usual bacteriological as well as clinical methods of diagnosis were employed without avail in the attempt to discover the cause of the fever, and for this and other reasons it appears probable that the differentiation of Indian fevers is not yet complete.

Apparently quinine prophylaxis was carried out with considerable attention to detail in all the jails of Bengal, the Punjab, the North-West Frontier Province and Burma, and in these provinces the Inspectors-General have issued instructions to all superintendents of jails detailing the method of distribution of the quinine and the precautions to be taken to guard against failure. In Bengal and the North-West Frontier Province the usual procedure is to give a dose of fifteen grains of quinine sulphate on two successive days each week, and in the Punjab a similar dose is given once a week to all male prisoners and a dose of ten grains to all female prisoners. In Bengal it has been found that cases of cinchonism and vomiting after the prophylactic doses are extremely few if they are dispensed in three or four ounces of water instead of in only one ounce. In Burma the practice is to treat all prisoners who have suffered much from malaria before admission to jail with ten grains of quinine twice weekly until the disease is eradicated. The dates between which the measure was carried out were in Bengal and the North-West Frontier Province the 1st of July and the 30th of November; in the Punjab the measure was carried out during four months. Little or no information about this measure is given in the reports from other provinces. The Inspector-General of Prisons, Madras, says that it was carried out in seven jails, but that there is a want of uniformity in the methods of administration. Apparently the measure was very successful in the large central jail at Trichinopoly, where according to the report of the medical officer the prisoners received a dose of fifteen grains of quinine on three successive days at intervals of six days for three months. The Inspector-General of Prisons in the United Provinces considered that quinine prophylaxis might be tried more fully with benefit. The matter is not referred to by the Inspectors-General of Prisons in the Central Provinces* and Eastern Bengal and Assam, and as regards Bombay it is stated that quinine was issued for prophylactic use, but no details are given.

* The Inspector-General of Prisons, Central Provinces, has recently (June 1908) issued a detailed circular containing instructions for the carrying out of quinine prophylaxis in all malarious jails.]

Malarial fever is by far the most frequent cause of sickness in nearly all jails, and since it is a matter of common knowledge that in communities under complete control the number of cases of this disease can be reduced in a remarkable manner by carrying out efficiently the measure of quinine prophylaxis it would doubtless be of advantage if, for every jail in the different administrations, special instructions regarding the carrying out of this measure were issued by Inspectors-General. This recommendation does not imply that the instructions should necessarily be similar for every jail in an administration; some jails are only slightly malarious and the season of malaria is not the same in all localities, so that the doses of quinine, the intervals of time between the doses, and the dates between which the measure shall be carried out must be arranged to suit the requirements of each case. It should not be difficult, in consultation with the medical officers of different jails, to come to a decision as to the best plan to be adopted in each jail and there is little doubt but that the results would justify the labour involved.

Dysentery.

Dysentery has never been less prevalent and has never caused a lower mortality in the jails of India than during 1907. The disease caused 6,328 admissions into hospital and 240 deaths, as compared with 7,525 admissions and 310 deaths in 1906. The admission rate per thousand in 1907 was 67·9 as compared with 78·9 in 1906, and the death rate 2·57 as compared with 3·25. The disease was less prevalent than in the previous year in all administrations except Burma and the North-West Frontier Province, and the death rates were lower in all administrations except the United Provinces and the Central Provinces. As in previous years most cases occurred during August. The fatality of all the cases recorded in India was 3·8 per cent. as compared with 4·1 per cent. in 1906, but it varied greatly in different administrations, from 12·73 per cent. in the Central Provinces to only 2 per cent. in Bengal.

Diarrhœa.

The number of cases of diarrhœa admitted to hospital was 3,207 and the number of deaths was 75, the admission and death rates per thousand being 34·4 and ·80, respectively, as compared with 39·1 and ·73 in 1906. The highest admission rates per thousand were 103.1 in the North-West Frontier Province, 75·6 in Eastern Bengal and Assam and 71·9 in Bengal, and the lowest 6·0 per thousand in Madras. Most of the prisoners who died from this disease were old men, many of whom before admission to jail were beggars. A considerable number, too, were confirmed opium-eaters. The mean age of those who died from this disease in 1907 was over 46 years. At the *post-mortem* examinations of fifteen cases ulceration of the intestines, evidently of long-standing, was found. Infirm prisoners on their admission are, of course, placed in a special gang and their dieting is a matter which receives attention but it is possible that the abundance of food which prisoners in jail receive may be, in the case of the "toothless old men" to whom some medical officers refer, a factor of importance in causing the diarrhœa from which these prisoners succumb.

Respiratory diseases other than pneumonia.

The number of admissions to hospital on account of these diseases rose from 2,400 to 2,568. The death rate was ·73 per thousand as compared with ·71 in 1906. The diseases were most prevalent in Bombay and the Punjab and least so in Burma. Of the 68 deaths 25 were due to bronchitis, seven to gangrene of the lungs, seven to asthma, six to broncho-pneumonia, six to congestion of the lungs, five to pleurisy, four to laryngitis, three to emphysema

and one each to œdema of glottis, pneumothorax, hœmoptysis, phthisis, œdema of the lungs.

Pneumonia.

There was a considerable increase in the prevalence of pneumonia, the number of cases being 1,074 as compared with 963 in 1906 and 896 in 1985. The death rate increased from 2·55 per thousand in 1906 to 2·90. The Punjab, the United Provinces, the North-West Frontier Province and Bombay were the administrations in which the disease was most prevalent. As a rule patients suffering from pneumonia in jails are promptly isolated, and when they have recovered or died, their bedding and clothing is disinfected as well as circumstances permit. In many jails, however, it is difficult, especially during the rainy season, to secure adequate disinfection and subsequent drying of blankets with the means at present available. It is the custom of most native patients to cover their heads and faces with the bed clothes and to cough and sometimes to spit without lifting their heads from beneath the blankets; for this reason it is probable that no means short of steam sterilization in an efficient apparatus can ensure thorough disinfection of the bedding of patients suffering from pneumonia, tuberculosis, and other infectious diseases. It is satisfactory therefore to find that in one or two provinces, central jails have been supplied with a steam disinfector.

Tubercle of the lungs.

The admission and death rates from tubercle of the lungs were only 7·5 and 2·74 per thousand respectively, as compared with 8·8 and 3·21 in 1906, and the death rate, with the exception of that recorded in 1895, was the lowest on record. The decrease, however, was confined to Bengal, the United Provinces, Madras and Burma; in all other administrations the admission and death rates were increased.

One of the most important factors in bringing about a reduction in the prevalence and fatality of tubercle of the lungs is the discovery of cases in an early stage. The degree of success which at present attends the search for signs of this disease, may be estimated to some extent from the figures of case mortality, from the figures showing the average duration of each fatal case, and from the results of *post-mortem* examinations on patients whose deaths have been wrongly recorded from diseases other than tuberculosis. Although the admission rate is usually highest in Bengal, the case mortality rate in this province is always lowest, and it has been steadily decreasing for a number of years. This is doubtless due in part to the better arrangements which exist for the treatment of patients, but in part it must be ascribed to greater success in discovering cases at an early stage. We may, indeed, regard with equanimity an increase in the admission rate in any province if it is not accompanied by an increase in the number of deaths and especially if it is accompanied by a diminution in the case mortality rate. The figures showing the average duration of each case from the time of its discovery to the time of the patient's death can be given for only three years—in 1905 among convicts who had been upwards of three years in prison when they were found to be suffering from tubercle it was 124 days, in 1906 it was 100 days and in 1907 it was 129 days. It may be hoped that in the near future this figure will become much higher. An examination of the *post-mortem* records for 1907 shows that even yet the presence of tubercle of the lungs is discovered in a number of cases only after the death of the patient. The diagnosis of the disease in its earliest stages is often difficult, but it is the patients in

these stages who are most likely to be benefited by treatment in the special open air wards which have been constructed in a number of jails, and for this and many other reasons the matter is of great importance. In connexion with it attention may be drawn to recent work regarding Calmette's ophthalmo-reaction test and von Pirquet's cuti- or dermo-reaction test for tuberculosis. These tests are very easily carried out and have been tried extensively in nearly all countries. Unfortunately, although it appears that the majority of observers consider them to be of great value, some have reported results which show that it is not always easy to interpret the reactions correctly, and some have reported cases in which the ophthalmo-test has been followed by a reaction so violent as to have led to ulceration and considerable opacity of the cornea with consequent impairment of vision. It appears probable that of the two tests the cutaneous one is the easier, the less severe, the less painful, and, possibly, the more trustworthy. Ligniéres has described a modification of von Pirquet's method, in which after a small area of skin has been shaved it is rubbed with a pad of cotton wool impregnated with tuberculin or dead tubercle bacilli. In the absence of tuberculosis no inflammatory reaction results but in the tuberculous the operation is followed by some œdema, redness, and sensitiveness of the skin and in most cases by an eruption.

Anæmia and Debility.

The yearly number of admissions into hospital under the heading anæmia and debility has not varied greatly during the last five or six years. In 1907 there were 1,048 cases and 42 deaths ascribed to this cause, as compared with 1,193 cases and 52 deaths in the previous year. The term describes symptoms common to many diseases, and for this reason its use is to be discouraged as far as possible, but it must be admitted that, for the condition present in old, infirm prisoners who, although not suffering from a definite disease are gradually getting more and more feeble, the term is not inappropriate. It is for such conditions only that the heading is now used by a number of medical officers, and of the 42 deaths recorded under it in 1907 no fewer than seventeen were considered by the medical officers to have been due to old age. On the other hand the *post-mortem* records show that in some jails more care in diagnosis is necessary.

Epidemic diseases.

The prevalence of the chief epidemic diseases among the jail population during 1907 may be indicated briefly. Cholera, small-pox, enteric fever and influenza were all less prevalent than in 1906, but plague caused 59 attacks with 30 deaths as compared with nineteen and eight respectively in that year. There were 140 cases of cholera with 55 deaths, the only considerable outbreak occurring in the Coimbatore central jail, in which there were 74 cases and 32 deaths. Small-pox caused 65 cases with only six deaths, and enteric fever the same number of cases with nineteen deaths. As usual no case of enteric fever occurred in the great majority of the jails, and the only jails in which more than one case occurred were the Cannanore central jail, the Lahore central jail, the Hyderabad central jail, and the district jails at Madura and Kohat. Influenza caused 454 admissions to hospital, more than half the cases occurring in Eastern Bengal and Assam. The administrations of Bengal, Madras, Bombay, the North-West Frontier and Burma were almost or completely free from the disease. Plague did not occur in the jails of Madras, Eastern Bengal and Assam or the North-West Frontier, and there were only two cases in the jails of Burma and three in

those of the Central Provinces. Of the remaining cases twenty-one occurred in the United Provinces, fifteen in the Punjab, eleven in Bengal, and seven in Bombay. Fifty-six cases of epidemic dropsy with five deaths and 107 cases of beri-beri with twelve deaths were reported during the year. Captain Munro, I.M.S., Deputy Sanitary Commissioner of Bengal, investigated epidemic dropsy in the Darjeeling Dooars in December 1907, and in the same month Captain Greig, I.M.S., Officiating Director of the Central Research Institute, made some enquiries regarding an outbreak of a disease resembling beri-beri in the Basti jail. In January 1908 Captain Delaney, I.M.S., was placed on special duty to investigate beri-beri in the jails of Eastern Bengal and Assam. Other medical officers have made observations regarding cases diagnosed under these headings, and a number of articles about them have been written. Apparently the differential diagnosis between the two diseases is not easy, and at least one medical officer is of opinion that although there are two names there is only one disease. As regards the discovery of the cause of the disease or diseases, and as regards the discovery of the mode of spread, little or no advance has been made.

Burma.

The average daily strength of the jail population in Burma rose from 13,369 in 1906 to 13,721 in 1907, and there was more or less overcrowding during some periods of the year in twenty of the thirty central and district jails. The health statistics of the prisoners showed a great improvement as compared with those of previous years, the admission, constantly sick and death rates falling from 280, 16, and 14·81 per thousand, respectively, in 1906 to 256, 14, and 11·88 per thousand in 1907. The three rates were the lowest on record for Burma. The death rate of the prisoners located in the six central jails fell from 13·59 in 1906 to the exceedingly low rate of 10·45, and of those in the district jails from 14·56 to 12·97. Abscesses, intermittent fever, and dysentery were the principal causes of sickness, and tubercle of the lungs and pneumonia the principal causes of death. The admission rate from intermittent fever fell from 49·7 per thousand in 1906 to 36·4, the rate being far lower than that in the jails of any other administration; and only three deaths from this disease were recorded. The Inspector-General reports that the value of the prophylaxis of malaria by the use of quinine is fully recognised, and that, on the whole, the measure appears to be carefully carried out. The microscope is largely used in a number of jails, and good instruments were supplied to the jails at Thayetmyo, Moulmein, and Mandalay during the year. Dysentery caused 275 admissions to hospital as compared with 243 in 1906, but there were only ten deaths as compared with twenty in that year. Iron drums fitted with taps and locks have now been supplied for the storage of pure water in all except two jails. There were only 67 cases of tubercle with 42 deaths as compared with 114 cases with 56 deaths in 1906. The Inspector-General draws attention to the danger of infection from blankets used by tuberculous prisoners, especially during the rainy season when it is difficult to ensure the proper drying of washed blankets. An important advance has been made in this connexion by the provision of a Thresh's disinfector to each of the central jails in the province. Proposals for the construction of a separate jail or of a ward, as an annexe to one of the existing jails, to accommodate 50 tuberculous prisoners are under consideration by the Local Government. Five cases of cholera (three fatal) and two of plague (one fatal) occurred during the year. In a number of the jails the store rooms for grain have been made rat proof.

Eastern Bengal and Assam.

Lack of sufficient accommodation is a defect in most of the jails in Eastern Bengal and Assam, and during 1907 with an increase of 439 in the daily average strength there was overcrowding in 19 of the 21 principal jails. Defective drainage and dampness of barracks are the defects most commonly reported by medical officers, and there is separate hospital accommodation for cases of infectious disease in only seven or eight jails. The admission and constantly sick rates in 1907 were lower than in 1906 and the death rate was 29·55 per thousand as compared with 29·69 in that year. There were fewer cases of pneumonia, dysentery, scurvy, anæmia and debility, and abscesses, but nearly all the other principal diseases were more prevalent. In the Barisal jail there were only 92 cases of dysentery and no death as compared with 360 cases with eight deaths in 1906 and 395 cases with nine deaths in 1905. The level of the whole interior of this jail was raised considerably, and improvements in ventilation, water-supply and conservancy arrangements were carried out, which, together with the minute care given to the dieting of the prisoners, doubtless contributed in bringing about the good result. The fatality of ague was as usual high in comparison with its fatality in other administrations, and the statistics and *post-mortem* records indicate that cases of kala azar are sometimes overlooked. Cases diagnosed as beri-beri occurred in four jails, and cases diagnosed as epidemic dropsy in two jails. The Inspector-General reports that as regards the latter disease segregation and a more liberal diet proved an effective check.

Bengal.

The mean daily population of the jails in Bengal fell from 14,857 in 1906 to 14,408 in 1907, but in thirty of the thirty-six jails overcrowding existed during a part or the whole of the year. In nineteen jails there is no separate hospital accommodation for cases of infectious disease. Of late years much has been done to improve the amount and nature of the accommodation provided for prisoners and to relieve the defect of "site over-crowding." During 1907 a new district jail was opened at Howrah; additions and extensions to the jails at Arrah, Bankipore, Gaya, Puri, and Cuttack were completed; the jails at Purneah and Balasore were being enlarged and improved; the jail at Khulna was being rebuilt; the dormitories in the central jail at Midnapore were being reconstructed; and many improvements were effected in the jails at Monghyr, Jessore, Krishnagar, Bankura, and Daltonganj. The native Presidency jail at Calcutta is soon to be demolished, and the rebuilding of the barracks and enlargement of the jail at Purulia has been sanctioned.

The health statistics of the prisoners during 1907 compared very favourably with those of previous years. The rate of admission into hospital fell from 1008·8 per thousand in 1906 to 938·2, the constantly sick rate from 38·0 to 35·6, and the death rate from 23·36 to 16·94, which is considerably lower than the rate recorded in any previous year. The principal causes of admission into hospital were intermittent fever (36·74 per cent. of all admissions), dysentery (15·26) and diarrhœa (7·66); and the principal causes of death were tubercle of the lungs (18·4 per cent. of all deaths), dysentery (16·8) and pneumonia (15·6). Intermittent fever caused an admission rate of 344·7 per thousand as compared with a rate of 330·7 in 1906, and the death rate was ·90 as compared with ·81. The Inspector-General reports that operations against mosquitoes as well as other anti-malarial measures, including the use of quinine as a prophylactic, are carried out in all jails. It is said that in the majority

of jails the dose of quinine for prophylactic purposes was fifteen grains which was given to the prisoners by selected convict overseers at 6 A.M. on Saturdays and Sundays from July to the end of November. Dysentery was much less prevalent than it has ever been, the admission rate being only 143·2 per thousand and the death rate 2·85 per thousand as compared with rates of 187·6 and 5·72 respectively in 1906. In nineteen jails there was no death from this disease during the year. The great reduction in prevalence was attributed by most medical officers to the short duration of the rainy season. An enquiry into the nature, causation and prevention of dysentery in jails was carried out by Captain Forster, I. M. S., at Midnapore, and the measures adopted on his recommendations doubtless contributed largely in effecting the great reduction in the prevalence and mortality of dysentery in this jail. The admission rate from tubercle of the lungs fell from 15·1 per thousand in 1906 to 12·5 in 1907 and the death rate from 4·31 to 3·12. Only nine cases of cholera (with five deaths) occurred during the year and eleven cases of plague (with nine deaths). Five of the plague cases occurred at the Buxar central jail among a gang of nineteen prisoners who had been employed in emptying and unroofing an old store-room. Several dead rats were found in the room and it was noticed that the prisoners while working were viciously attacked by fleas. Plague was very prevalent in the village and houses in the immediate neighbourhood of the jail walls.

The death rates in six jails where the average strength was more than one hundred were over thirty per thousand, these jails being Krishnagar (52·33), Hooghly (39·04), Purneah (34·35), Purulia (35·00), Puri (35·71), and Jessore (31·98). According to the reports of medical officers there are serious structural defects in nearly all these jails, and all were more or less overcrowded during some periods of the year.

United Provinces.

A number of the jails in the United Provinces are badly situated near bazaars, and some are reported to be very defective structurally. In about thirteen jails there is no separate hospital accommodation for cases of infectious disease. The average daily strength of the prisoners during 1907 was less by 985 than during 1906, but there was overcrowding during part of the year in twenty-five of the fifty-six jails. Conditions of scarcity existed among the general population during a portion of 1907, and many prisoners were in feeble health on their admission to jail, but while the constantly sick rate was higher than in 1906 the death rate was only 15·03 per thousand as compared with 16·56 in that year. Pneumonia was considerably more prevalent and fatal than in the previous year, but there was a satisfactory decline in the admission and death rates from tubercle of the lungs, from 7·6 and 2·85 per thousand respectively, in 1906 to 5·4 and 1·67 in 1907. The death rate from dysentery was 1·93 per thousand as compared with 1·89 in 1906. There were six jails in which no case of this disease occurred, and 23 in which the number of cases did not exceed ten. Death rates over thirty per thousand were recorded in six jails where the average annual strength was over 150, the highest rates among prisoners in these six jails being 53·10 per thousand recorded in the Saharanpur district jail, 46·05 in the Basti district jail, 42·55 in the Ghazipur district jail, and 38·89 in the Gorakhpur district jail. In the Saharanpur jail dysentery was very prevalent. The Inspector-General reports that the jail is very defective

structurally, but that it has been much improved and is now in fair sanitary condition. Funds have been allotted for a separate dysentery ward in this jail. In the Basti jail an outbreak of "beri-beri" which caused 81 admissions to hospital and four deaths occurred during November and December. This was the only jail in which cholera appeared during the year; there were two cases of which one was fatal. The Ghazipur jail is old and structurally very defective but the Inspector-General reports that attempts are being made to improve the ventilation and lighting of the barracks. During the year under notice the jail contained an unusually large number of old and infirm prisoners. In the Gorakhpur jail dysentery was more prevalent than in any other. Many prisoners were in bad health on their admission to the jail, and of the twenty-one who died, fourteen had to be admitted at once to hospital and four to special or infirm gangs.

Punjab.

The daily average population of the jails in the Punjab has been falling more or less steadily since 1901, and in 1907 it was only 11,154 as compared with 11,744 in 1906. Although the accommodation in all the jails is for a much larger number than this, the necessity of distributing the prisoners by classes renders the prevention of overcrowding in some jails difficult, and during 1907 the central jails at Montgomery and Lahore were seriously overcrowded throughout the year. The Inspector-General draws attention to the pressing need for the erection of the proposed central jail at Ludhiana. A proposal has been made to establish at Kasauli a subsidiary jail to accommodate prisoners bitten by rabid animals. The rate of admission to hospital decreased from 736·6 per thousand in 1906 to 706·8 in 1907, but the constantly sick rate rose from 26·0 to 30·3, and the death rate from 15·75 to 19·81. The admissions from intermittent fever, which was the principal cause of sickness, were less by 845 than in 1906, but in view of the great care exercised in the distribution of quinine as a prophylactic the Inspector-General had anticipated a more striking improvement. He examined the methods of distribution in 23 jails, and found that where the procedure was free from fault there was practically no malaria among the prisoners. Tubercle of the lungs, pneumonia, and dysentery were the principal causes of death being responsible for 19·5, 20·4, and 10·4 per cent. respectively of the total number of deaths recorded. Tubercle of the lungs caused 118 admissions into hospital, and 43 deaths as compared with 86 admissions and 45 deaths in 1906. In the Montgomery central jail there were 38 cases with 16 deaths during the year. Funds had been allotted for building a special open air ward for tuberculous patients in this jail, but, when famine threatened, the allotment had to be withdrawn. A special ward was built in the Rawalpindi jail during the year. Pneumonia caused 215 cases and 45 deaths against 130 cases and 31 deaths in 1906. Ten of the deaths occurred in the Montgomery central jail and six in the Mooltan central jail. Dysentery was less prevalent and caused less mortality than in the previous year. No case of cholera occurred in the jails and only fifteen cases of plague (eight of which were fatal). In view of the terrible prevalence of plague among the general population of the province the fact that although many jails were threatened the disease did not spread in any, shows how successful were the methods employed.

North-West Frontier Province.

In this administration there are five jails, the accommodation being for 1,515 prisoners of all classes. The average strength of the jail population in 1907 was 1,183, and there was overcrowding in the Abbottabad jail for 175 days, in the Kohat jail for 41

days, in the Peshawar jail for sixteen days, and in the Bannu jail for eleven days. Sickness and mortality were considerably less than in the previous year, the admission rate being 1208·8 per thousand and the death rate 17·75 per thousand as compared with rates of 1464·6 and 25·38 respectively in 1906. Intermittent fever caused 35·59 per cent. of the total admissions to hospital, but the admission rate was only 430·3 per thousand as compared with 869·2 in 1906, and there was no death from this disease during the year. In accordance with the instructions of the administrative medical officer quinine was issued to all convicts in 15-grain doses every fifth and sixth day from the 1st of July to the end of the fever season. The measure is said to have proved highly beneficial. Dysentery caused 104 admissions into hospital as compared with 102 in 1906, tubercle of the lungs ten as compared with ten, and pneumonia 29 as compared with 31. Diarrhœa was more prevalent than in 1906, and caused 122 admissions into hospital and one death.

Central Provinces and Berar.

The average strength of the jail population in the Central Provinces and Berar fell from 3,329 in 1906 to 3,241 in 1907, but the number of under-trial prisoners increased, and there was overcrowding in the wards for these prisoners in eight district jails. The admission and constantly sick rates were lower than in the previous year, but the death rate rose from 13·82 per thousand to 19·44. Intermittent fever, abscesses and dysentery were the principal causes of admission into hospital, and dysentery and tubercle of the lungs the principal causes of death. Intermittent fever caused 29·87 per cent. of the total admissions from all causes, but the admission rate from this disease was only 157·1 per thousand as compared with 196·8 in 1906. At the Saugor district jail the medical officer, Captain Kenrick, I.M.S., found that several patients whose illness had been recorded as malaria were suffering from a form of relapsing fever, spirochetes similar to the *spirillum obermeyeri* being found on microscopical examination of the blood. Dysentery caused fourteen deaths, of which seven occurred in the Raipur central jail where the health statistics of the prisoners compared unfavourably in all respects with those of the previous year. In all the jails there were only twelve admissions to hospital for tubercle of the lungs, but eight of these cases were fatal during the year. They occurred in the following jails: five cases (four of which were fatal) in the Raipur central jail, two cases (both fatal) in the Jubbulpore central jail, one case (fatal) in the Nagpur central jail, one case (fatal) in the Mandla district jail, and one case in each of the jails at Betul, Bhandara, Saugor and Akola. The statistics when compared with those of other provinces indicate a probability that the early discovery of cases of tubercle of the lungs is a matter to which the attention of jail superintendents might be profitably directed. No case of cholera and only three of plague occurred in the jails during the year.

Bombay.

The daily average population of the jails in Bombay decreased from 7,925 in 1906 to 7,537 in 1907. The common prison at Bombay and the district prisons at Rajkot and Dhulia were overcrowded throughout the year; there was much overcrowding in the Hyderabad central prison during eight months of the year; the district prison at Dharwar was slightly overcrowded during six months; the Yerrowda central prison during four months; and the Bijapur district prison during two months; and two or three other prisons were overcrowded for a few days only. The admission, constantly sick and death rates were 689, 31 and 20·69 per thousand repectively in 1906 as compared with 693, 32 and 20·96 in 1907. Intermittent fever, which was the principal cause of sickness during 1907, and pneumonia, which was the principal cause of death, were both more prevalent than in 1906 but there was a satisfactory decline in the admission and death rates

from dysentery, and no case of cholera occurred during the year. The increase in the prevalence of ague was greatest in the Yerrowda central prison, the large number of cases being attributed to the fact that quinine prophylaxis was not carried out so carefully as in the previous year. Pneumonia caused 149 admissions to hospital and 44 deaths, of which 62 admissions and eighteen deaths occurred in the Hyderabad central prison and 53 admissions and thirteen deaths among the Sind gang. The overcrowding which existed in the Hyderabad central jail was considered by the medical officer to be the chief cause of the large number of cases of respiratory disease in that jail. The prisoners in the Sind gang are employed on railway work and live in camp, so that they are more exposed to the influences of climatic changes than are prisoners in the jail enclosures. Tubercle of the lungs caused 44 cases and nineteen deaths as compared with 40 cases and fifteen deaths in 1906. There was no case of this disease among the prisoners in the Deccan or Sind gangs, both of which are engaged entirely in extra-mural labour.

Madras.

There are now eight central and eight district jails in the Presidency as the Nellore district jail was closed on the 1st of July 1907. The daily average strength of the prisoners fell from 10,428 in 1906 to 10,166 in 1907. There was overcrowding in the Tanjore district jail for 84 days, in the Salem central jail for 40 days, and in the Bellary central jail for 17 days. The rate of admission to hospital fell from 416·5 per thousand in 1906 to 375·6 and the death rate from 21·77 to 18·79. Malarial fevers and dysentery were the principal causes of sickness, and cholera and dysentery the principal causes of death. The admission rate from malarial fevers was 57·2 per thousand as compared with 60·2 in 1906, but ten deaths were returned under this heading as compared with only two in that year. The Inspector-General reports that quinine was used as a prophylactic in seven jails, but that there was a want of uniformity in the methods of administration. The measure appears to have been attended with excellent results in the large central jail at Trichinopoly, for in this jail there were only thirteen admissions to hospital on account of malarial fever (with no death) during the year; the medical officer reports that for three months a dose of fifteen grains of quinine sulphate was given to the prisoners on three successive days with weekly intervals. The admission rate from dysentery was considerably lower than in 1906, and there were only twenty-nine deaths from this disease as compared with forty-five in that year. Cholera caused 106 admissions to hospital and 39 deaths, of which 74 admissions and 32 deaths occurred in the Coimbatore central jail. The medical officer of this jail reported that the outbreak appeared in an explosive way and was undoubtedly water-borne. The first patient was a man who had been five years in the jail. The origin of the outbreak was not definitely traced, but cholera was prevalent in many parts of the district and a number of prisoners came from places infected with the disease. The admission rate from tubercle of the lungs fell from 9·7 per thousand in 1906, to 6·5, the lowest rate since 1894, but there were twenty-five deaths from this disease as compared with twenty-six in 1906. In the Bellary central jail a special ward for the treatment of tuberculous patients on the open air system was completed during the year, and this ward as well as the one in the Trichinopoly central jail are utilized for patients from other jails in the Presidency.

Ajmer-Mercara, Quetta and Secunderabad.

There was no overcrowding in the jail at Ajmer during 1907. The water-supply from the jail wells was insufficient and water had to be purchased. The average annual strength of the prisoners was 387 and 197 admissions into hospital, and six deaths occurred during the year, giving ratios of

431·5 and 15·50 per thousand respectively as compared with 412·9 and 21·51 in 1906. In the Mercara jail, where the average annual strength was 89, there were eleven deaths during the year, three of which were due to dysentery and one to phthisis. At Quetta, where the average strength was 46, and at Secunderabad (average strength 79) there was no death during the year.

Andamans.

The convicts in the Andamans live under conditions which in many respects are very different from those in Indian prisons, and because they are scattered over a wide area and engaged upon work which necessitates large parties being sent to distant islands or stations where there is no medical officer, the supervision of all matters relating to health, dieting, and labour, so necessary to combat the influences of the peculiar and trying climate, cannot reach that degree of perfection which is such a prominent feature of the conditions under which the convicts in Indian prisons live. The present senior medical officer, Major Fearnside, deals with this problem of supervision at some length in his annual report; he points out that in the absence of such close supervision as is exercised in an Indian jail, prisoners are often drafted to labour for which they are physically unfit, and that as regards the food supply of the convicts one of the most unsatisfactory features of the settlement is the pilfering of food which occurs in the numerous kitchens. He considers that much of the ill-health of the convicts is due to their not receiving the full supply of food to which they are entitled, and notes that in 1906 it was found that 73 per cent. of the convicts had lost weight. The average strength of the convict population during 1907 was 14,411 or 277 less than in 1906, and there was no overcrowding during the year. In comparison with previous years the health statistics are favourable, but they are still far from being satisfactory in the light of the fact that the convicts are very carefully selected before transportation. The admission and constantly sick rates were as usual very high, but the death rate was only 23·59 per thousand as compared with 27·30 in 1906 and 38·96 in 1905. The reduction in the death rate was due to smaller numbers of deaths from dysentery, malaria and pneumonia, and it was greatest among new arrivals; among labouring convicts (excluding new arrivals) the death rate was slightly higher than in 1906. In accordance with the recent instructions by which the age limit for transportation was reduced from 45 to 40 years and by which no convict who had suffered from fever, dysentery, or lung disease, was to be transported to Port Blair until he had performed ordinary labour and maintained good health, for at least three months subsequent to his illness the selection of convicts for transportation had been carried out more strictly in India and the senior medical officer reports that new arrivals were posted to healthy stations in the settlement. In the female jail, which is under the charge of a commissioned medical officer there was no death during the year, and this is attributed to better supervision and to improvements in the water-supply. Dysentery, malaria and tubercle of the lungs continue to be the most important diseases of the settlement. The admission rate from dysentery was higher than in 1906, but the death rate fell to 3·12 per thousand, which is lower than in several of the Indian administrations. The statistics indicate that the importance of admitting patients into hospital at an early stage of the disease is realized. The senior medical officer notes that the seats and partitions of the latrines are of wood and that they become foul. He recommends that they should be renewed every few years, but in view of the probable mode of spread of dysentery it would be preferable to construct the latrines without seats, on the pattern of those in Indian jails.

Despite the greatly increased rainfall during 1907, or perhaps in consequence of it—for the influence of rainfall on the prevalence of malaria in very wet climates is not yet clearly known—the admission rate for ague was less than in the previous year. Mosquito brigades were employed in Ross, Aberdeen, and Viper, and Major Fearnside considers that they should be employed throughout the settlement. The admission rate for tubercle of the lungs rose from 6·9 per thousand to 8·2, but there was a slight decrease in the death rate. A hospital for female prisoners suffering from this disease was constructed at South Point during the year.

The General Population.

(For Statistical Tables *see* page 150 to 153)

The general climatic conditions of the year 1907 were characterised by the late arrival of the monsoon currents, their persistent feebleness except for a brief period, chiefly in August, and their extremely early withdrawal. The prices of food grains ruled high nearly everywhere, which must undoubtedly have affected the public health: indeed, as it is expressed by the Sanitary Commissioner for Bengal, the poorer classes in many places were, owing to high prices, obliged to live on unsuitable and unwholesome food. The meteorological conditions and level of prices in the several provinces are briefly detailed in the succeeding paragraphs.

The total population under registration in British India is now the same for both births and deaths. Till the year 1906, the population under registration for births was less than that under registration for deaths, the reason being that in Upper Burma the registration of births was confined to thirteen towns. Since the 1st January 1907 the registration of births has been undertaken in both the towns and rural areas of eleven districts in Upper Burma. The total population now under registration in British India stands at 225,921,260. This shows a decrease on the total of 226,125,682 among whom deaths were registered during the preceding year, and is accounted for by the elimination of the population of tracts not under registration in the Hazara district of the North-West Frontier Province, and also by a reduction in the population for which returns of vital statistics were furnished in the Madras Presidency. There are still areas not yet brought under registration, which in the Madras Presidency are composed of the hill tribes of the Ganjam and Vizagapatam districts, the people of the Laccadive and Aminidivi Islands and of an estate in Kurnool; in Eastern Bengal and Assam, the hill districts; in Bengal, Angul; in the North-West Frontier Province, as already stated, certain tracts of the Hazara district; and certain areas in Lower Burma and considerable areas in Upper Burma. The population figures used in this section are those of the census of 1901 which, as explained in the last report, become less accurate for the calculation of ratios of births and deaths as the date of the census recedes.

Births in British India.

The total number of births recorded during the year 1907 amounted to 8,505,563 as compared with 8,448,478 during 1906. The birth rate per thousand on the census population was 37·65 in 1907, against 37·80 and 39·13 in 1906 and 1905, respectively. The rate for the quinquennium ending with 1905 was 38·41 and for the quinquennium ending with 1906, it was 39·23. The Central Provinces which had occupied the highest place in 1906 with a ratio of 51·72 per thousand, again showed the highest rate, *viz.*, 52·46 per thousand, and excluding the small provinces of Coorg and Ajmer-Merwara, where the rates were 23·83 and 31·20 per thousand, respectively, the lowest rate was again recorded in the Madras Presidency, 30·8, against 30·9 the year before. Five provinces showed increased birth

rates compared with 1906, *viz.*, Bengal (·38), the United Provinces (·96), the Central Provinces (·74), Lower Burma (·32), and Ajmer-Merwara (2·29); while the decreases were, in Eastern Bengal and Assam (·37), the Punjab (2·9), North-West Frontier Province (6·1), Madras (·1), Coorg (2·27) and Bombay (·81). Comparison in the case of Upper Burma is not possible as the figures for the years preceding 1907 relate to thirteen towns only, while those for 1907 are for eleven districts. The birth rate exceeded the death rate in seven provinces, the position being reversed in the case of the other five. The highest rates in the former occurred in the Central Provinces (10·76), followed by Eastern Bengal and Assam (7·71) and Upper Burma (7·01), and in the latter, except for the high rates in the Punjab (21·3) and Coorg (11·32), the next highest was in the North-West Frontier Province (2·6). The mean number of males born to every 100 females was as usual 106·8, the range lying between 120·4 in the North-West Frontier Province and 104 in Eastern Bengal and Assam.

Deaths in British India.

The total number of deaths registered was 8,399,623, compared with 7,852,330 in 1906 and 8,117,771 in 1905. The ratio per thousand of the population was 37·18 against 34·73 and 35·96 in the two years 1906 and 1905. The quinquennial mean for 1902-06 and for 1901-05 was 33·96 and 32·91 per thousand, respectively. Five provinces show rates in excess of those for the preceding year, the most remarkable being the Punjab, which recorded the rate of 62·10 per thousand as compared with 36·94 in 1906 and 45·3 the quinquennial mean. Of the ratio of 62·10, nearly half, or 30·3, was due to plague and 20·2 to fever. Coorg shows an increase of 5·89, the United Provinces an increase of 4·39 and Bengal and the North-West Frontier Province increases of less than 2 per thousand. All the other provinces show a lower death rate than during 1906, the largest fall, 3·1 per thousand, taking place in Madras which is accounted for by cholera being less prevalent than in 1906. By provinces the rates ranged between 62·10 in the Punjab and 24·3 in Madras. As is usually the case the urban mortality exceeded the rural, except in the case of Bengal, Eastern Bengal and Assam, and the Punjab. The highest rate among towns was 144·31 recorded in Dinga, a town of 5,412 inhabitants in the Gujrat district of the Punjab, and the highest in districts, 106·67, was also recorded in the Gujrat district, in both cases due to plague.

By months the highest incidence of deaths occurred during April, and the next highest in December, March and May in the order named. As in the previous year, the mean female death rate exceeded the mean male death rate in the United Provinces, the Punjab, the North-West Frontier Province, Ajmer-Merwara and Coorg, but elsewhere the male rate was the higher.

Male and female infants under one year of age died at the rates, respectively, of 221·72 and 209·33 per thousand born, compared with rates of 228·30 and 217·52 in 1906. The lower rate in a year of severe plague suggests that infants are not ordinarily attacked by this disease. The highest rate of mortality among male infants was 302·91 per thousand in Coorg, the next highest rate being 284·79 in the Central Provinces, and the lowest 184·09 in Eastern Bengal and Assam, closely followed by the rate of 185·5 in Madras.* As regards deaths of female infants, the Central Provinces recorded the highest rate which was 257·91 and Coorg came next with 254·71, which reverses the position as regards male deaths in these two provinces, while the lowest rate, *viz.*, 160·4, was recorded in Lower Burma and the next lowest, 166·67, in Eastern Bengal and

Assam. In every province the number of males born exceeded the number of females born, and similarly the death rate of male infants was in excess of that of female infants in all provinces with the solitary exception of the Punjab.

No province escaped the visitation of cholera which was severe in Bengal (death rate 4·07 per thousand), Eastern Bengal and Assam (2·58) and Madras (2·2), but the Punjab (·02) and Ajmer-Merwara (·002) were only slightly affected. Small-pox was chiefly prevalent in Coorg (1·17) and Ajmer-Merwara (1·04) and in two others only, *viz.*, Bengal (·57) and the Punjab (·55), did the rate exceed ·5 per thousand. No one province escaped plague which was extraordinarily severe in the Punjab (30·27), and severe in the United Provinces (6·90), Bombay (5·06), and the Central Provinces (3·18). On the other hand, the death rate from plague in Eastern Bengal and Assam was as low as ·0002 per thousand, and very low in Ajmer-Merwara (·03), Coorg (·01) and Madras (·1). The fever death rate was higher than in 1906 in six provinces and lower in an equal number, but the highest rate of 27·62 in the United Provinces in 1906 was exceeded by the rate of 28·31 in 1907 which, in the presence of plague in a severe form, suggests deaths due to the disease being returned as fever.

Dysentery and diarrhœa prevailed to more or less the same extent as the year before, except in Coorg where the rate of ·78 in 1906 increased to 2·08, for which no explanation is available. Respiratory diseases continued to be badly registered, there being great variations in the death rate per thousand in the several provinces.

Lower Burma.

The average rainfall was much in excess of that of the preceding year, all except three districts sharing in the increase. The price of rice was above the average throughout the year in all the districts except Rangoon and Thaton.

The population under registration numbered 5,568,479 excluding certain areas where registration is not yet complete. The number of births increased from 180,025 in 1906 to 181,834, and the birth rate from 32·33 to 32·65 per thousand, which was slightly below the quinquennial mean of 32·90. In one district only, *viz.*, Tavoy (45·92) did the birth rate exceed 40 per thousand, though this rate was closely approached by Tharrawaddy (39·55) and Thayetmyo (39·10). On the other hand, in five districts, or the same number as in 1906, the rate fell below 30 per thousand, *viz.*, Toungoo (29·49), Kyaukpyu (28·92), Maubin (27·38), Akyab (27·27), and Rangoon (16·62). The mean birth rate was 33·77 in rural areas and 25·1 in towns, but the latter is low owing to the large disproportion of the sexes in the three larger towns of Rangoon, Moulmein, and Akyab, which recorded rates of 16·62, 23·61 and 17·21, respectively. Excluding these towns the rate becomes 31·88. The proportion of male to female births was 107 to 100, ranging between 133 in Mergui and 102 each in Amherst and Toungoo.

The number of deaths fell from 151,193 in 1906 to 149,472, and the death rate from 27·15 to 26·84, but still in excess of the quinquennial mean of 23·92. Three districts only, excluding Rangoon, recorded rates in excess of 30 per thousand, *viz.*, Akyab (31·76), Mergui (31·72) and Pegu (30·59), while Tavoy (21·26), Myaungmya (20·59) and Maubin (18·87) recorded the lowest rates. In rural areas the mean death rate was 24·58 compared with 42·18 in towns. Among the latter Pegu recorded the highest rate, 65·10, of which no less than 32·97 or nearly half the deaths were recorded under "all other causes," followed by

Bassein with a rate of 63·21, of which 12·21 was due to cholera, 11·74 to plague, and 18·70 to "all other causes." The lowest rate was again recorded in Sandoway (17·93). The highest monthly death rate was recorded in December, and the lowest in May.

By religions, Hindus and Muhammadans died at the rate of 34·14 and 28·98, respectively, Buddhists at the rate of 26·25, Christians at 18·64, and "other classes" at 38·82 per thousand. The provincial Sanitary Commissioner points out that it is unfortunate that the population has been classified by religion instead of by race, which renders it impossible to consider the results of the registration of vital statistics of communities living in widely different circumstances. As an example it is pointed out that Burmese Buddhists amount to only two-thirds of the total population professing this religion, the remaining one-third being Arakanese, Shans, Chinese and converts of other races, and therefore the death rate among Buddhists is not that among the Burmese.

The male and female infant mortality calculated on the births of the year was 204·0 and 160·4 per thousand, respectively; and on the census population, boys and girls between one and five years of age died at the rates of 30·01 and 25·33, respectively. At all age periods the male death rate exceeded the female death rate, the mean for the province being 28·51 for the former and 24·77 for the latter.

Upper Burma.

Compared with the preceding year there was a great decrease in the rainfall, the shortage being more marked in some places than in others, but in the dry zone more rain was received than in 1906 when great scarcity of food resulted from the failure of the crops. Some scarcity was experienced at the end of 1907 in the Sagaing, Myingyan and Meiktila districts and the northern sub-division of the Yamethin district which led to some emigration. The price of rice was above the average in all districts except Meiktila and Myingyan, where however some scarcity was felt towards the end of the year.

From the beginning of 1907 the registration of births as well as of deaths was extended to eleven districts, though considerable areas still remain to be added. The population under registration for births before 1907 was 303,014 in thirteen towns, but now both births and deaths are registered among a total population of 2,917,501.

The total births numbered 96,699, giving a ratio of 33·14 per thousand. As this is the first year of complete registration of births, no comparison with preceding years is possible. The highest rate recorded was 43·19 in Shwebo and the lowest 21·64 in Yamethin.

In rural areas the mean birth rate was 33·47 and 32·16 in towns. The percentage of male to female births was 106, ranging between 107 in five districts and 104 in two.

The number of deaths registered was 76,220 or 273 fewer than in 1906, and the death rate was 26·13 or 0·9 lower, compared with the quinquennial mean of 21·33. The highest death rate among districts was recorded in Kyaukse (39·32) and the lowest in Sagaing (18·50), while the mean in rural areas was 24·39 and in towns 39·69. January was the month with the highest mortality and May with the lowest.

By religions, the death rates were, Hindus 34·16, Muhammadans, 31·52, Buddhists 25·94, Christians 24·54, and "other classes" 40·75.

Male and female infants died at the rates, respectively, of 243·0 and 211·7 per thousand born, and boys and girls between one and five years of age at 25·18 and 23·67 per thousand of the census population. At all age periods except 20-30 and 30-40, the male death rate was higher than the female death rate, the mean rates for all age periods being 27·67 for males and 24·75 for females.

Eastern Bengal and Assam.

The rainfall during 1907 was generally deficient throughout the province, and the monsoon terminated abruptly in September. The prices of food grains continued high but in no case was there any marked distress in consequence.

The population under registration, excluding 1,150,000 persons in the hill districts, numbered 29,812,735. Among this population there were 1,103,592 births, or 10,934 fewer than during 1906, giving ratios per one thousand of population of 37·01 and 37·38, respectively, against the quinquennial mean of 39·31. The diminution of the birth rate in ten out of fourteen of the Eastern Bengal districts continues, and the provincial Sanitary Commissioner while being unable to say to what this is due, states that there is no evidence that it is due to any widespread defect in reporting. The highest birth rates in districts were reported from Goalpara, 49·45, and Noakhali, 44·51, per thousand, which also return the highest quinquennial averages in the province, *viz.*, 46·33 and 48·03, respectively. Chittagong came next with a rate of 42·04 per thousand. The lowest rates were returned by Pabna 33·33, Mymensingh 33·01 and Sibsagar 29·94. In rural areas the average birth rate was 37·35 per thousand, the rates ranging from 82·02 in Ripu (Goalpara) to 18·97 in Netrokona (Mymensingh); in towns the highest rates were 54·08 in Barpeta and 46·17 in Sunamganj and the lowest 5·35 in Nalchitti and 2·10 in Jhalakhati, the two last named being small mercantile centres. Barpeta and Jhalakhati also occupied the highest and lowest places among towns in the preceding year.

The mean percentage of male to female births was 104 against 107 in 1906, Chittagong returning the highest, 110, and Rangpur the lowest, 82.

The deaths registered in the province numbered 873,752, showing a fall of 70,583 compared with the preceding year and a death rate of 29·30 against 31·67, the quinquennial mean being 32·19. The year was on the whole a healthy one, and three districts only, Rajshahi, Lakhimpur and Malda reported anything like marked increases on the average rate of the past five years. The highest rates in districts were, Rajshahi 48·63, Malda 42·48 and Dinajpur 42·47, in all of which the death rate from fever was over 34·0 per thousand, against the provincial mean of 21·17, and in the first named cholera (8·75 per thousand) was also severe. The lowest rates were recorded in Sylhet, 22·22, Cachar 21·98 and Mymensingh, 21·38, the first two returning the low fever death rates of 9·47 and 9·87, respectively, and the comparatively high rates of 7·84 and 8·03 under "all other causes."

The mean death rate was 29·45 per thousand in rural areas and 22·67 in towns: among the former, Ripu (Goalpara) returned the rate of 73·20, which was chiefly due to fevers, and six circles in the Rajshahi district reported a death rate of over 50, and three of over 60 per thousand, the mortality being chiefly due to fevers and cholera. Among towns the highest rates were Sherpur (Bogra) 43·85 per thousand which suffered from an outbreak of cholera among 4,000

inhabitants, and the lowest in Chandpur, 8·01 per thousand; Mymensingh and Jalakhati returned very slightly higher rates, *viz.*, 8·24 and 8·97. The highest monthly mortality occurred in December and the lowest in August.

"Other Classes" had the highest death rate, 42·94, followed by Muhammadans, 30·12, Hindus, 27·30, Buddhists, 24·05, and Christians, 22·96.

Male and female infants died at the rates of, respectively, 184·09 and 166·67 per thousand born, and boys and girls between one and five years of age at the rates of 39·20 and 34·61 of the census population. At the age periods 15-20, 20-30 and 30-40, females died at a higher rate than males, but at the other age periods the male rate was the higher. The mean rate for the province was 30·23 for males and 28·34 for females.

Tea gardens.

The mean annual strength of the coolies employed on tea gardens in Assam, during the twelve months ending the 30th June 1908, increased from 680,772 to 712,002. Of the total labour force 37·17 per cent. were employed in the Surma Valley and 62·83 per cent. in the Assam Valley, the distribution showing a slight decrease in the Surma Valley with a corresponding increase in the Assam Valley.

The birth rate for the year was 27·6 per thousand of the total population, and 90·0 per thousand of the adult female population, compared with 28·3 and 91·8 per thousand, respectively, in 1906-07. The corresponding provincial ratios for the calendar year 1907 were 37·01 and 125·7 per thousand.

The registered death rate increased from 22·0 per mille to 29·2, the total number of deaths being 20,772. The provincial registered death rate for the year 1907 was 29·30 per mille. The principal causes of deaths were cholera (3,603), dysentery (3,558), malarial fever (2,740), respiratory diseases (2,296) diarrhœa (1,936) and anæmia of coolies or anchylostomiasis (1,926). The death rate among coolies from all recruiting areas showed an increase. The heavy mortality from cholera, which in the preceding year was responsible for only 1,164 cases accounts to a large extent for the higher death rate.

Of a total of 740 gardens, thirty were brought on to the unhealthy list, *i.e.*, with a death rate of over 70 per mille on the Act population. In the preceding year only eight of the 748 gardens were declared to be unhealthy.

There were 713 deaths among coolies journeying to the Assam Valley against 98 in the previous year: 672 of the deaths were due to cholera. No deaths were reported among coolies in transit to the Surma Valley.

Bengal.

The rainfall of 1907 was very irregularly distributed. During February, March and April there was exceptionally heavy rain, and although the south-west monsoon was actively established about the middle of June, the rain bearing current was restricted to a comparatively small area and never extended westwards beyond Bihar. The monsoon ceased early, and this combined with severe floods in some places, affected the outturn of food grains which was more or less below the normal, except in Muzaffarpur, Darbhanga, Bhagalpur and Darjeeling where it was almost normal or slightly above it. The deficient rainfall and heavy exportation to places affected by scarcity, kept up prices generally which compelled the poorer classes in many places to live on unsuitable and unwholesome food.

The total population under registration for births and deaths, excluding Angul to which the system has not yet been extended, numbered 50,528,446. The number of births recorded was 1,905,425 or 19,700 more than during the preceding year, and the birth rate 37·70 against 37·32 per thousand, the mean of the previous five years being 39·08. The highest rates recorded in districts were Palamau 54·59, Gaya 50·75 and Hazaribagh 50·62 per thousand, and the lowest

excluding the urban district of Calcutta where the rate was 19·13 per thousand, in the 24-Parganas, 30·77, Darjeeling, 29·93 and Jessore, 29·58 per thousand.

The town of Jamalpur in the Monghyr district which almost always returns the highest birth rate, headed the list with a rate of 67·14 per thousand followed by Sahibganj in the Santhal Parganas with a rate of 65·22. The lowest rates were recorded as usual in Budge Budge 4·29, Tittaghar 6·41, and South Barrackpore 7·56, and must continue to do so as they are trade-centres with a large floating population of male coolies. In rural areas 92 circles returned a birth rate of over 45 per thousand, compared with 69 and 82 in the two preceding years. The highest rate was 111·74 per thousand in Dum Dum, and as the rate is unusual, an enquiry is being made; following Dum Dum, came Palkot in the Ranchi district, Sujaganj in the Murshidabad district and Asasuni in the Khulna district with birth rates of 84·68, 79·35 and 66·48 per thousand, respectively. The mean percentage of males born to females born was 105, the same as in 1906, the rates ranging from 110 each in Howrah and Calcutta to 100 in Singhbhum.

The number of deaths during the year numbered 1,906,192 or 82,949 more than during 1906, and the death rate was 37·72 per thousand against 36·08 in the previous year and the quinquennial mean of 34·68. The increased death rate is attributed to the high prices of food grains and the general unhealthiness of the year, and was chiefly due to more deaths from fever, cholera and plague. Palamau which recorded the highest birth rate among districts, also recorded the highest death rate, 56·0 per thousand; in this place the death rates from cholera (13·42) and fever (33·19) were well above the provincial mean from these causes. Next came Birbhum with the rate of 49·77 per thousand, and here the highest rate for fever (38·27) was recorded, followed by Patna with a rate of 48·50 per thousand including a high mortality rate from plague, *viz.*, 13·45 per thousand. The lowest death rates were recorded in Singbhum, Sambalpur and Champaran, where they were 23·73, 24·55 and 27·44 per thousand. In towns the highest rates were recorded in Chetra (Hazaribagh) 95·95 per thousand, Roserha (Darbhanga) 81·89 and Gaya, 81·50, and the lowest in Budge Budge, 7·66, Asansol (Burdwan) 11·33 and Cossipore—Chitpur, 12·61. One hundred and thirty-two rural areas, or more than double the number in the preceding year, returned a death rate of over 44 per thousand. The highest rate was 118·14 per thousand in Sujaganj, in which there was also a high birth rate, followed by Shahanagar with a rate of 87·54. Both these places, which are in the Murshidabad district, suffered severely from fever, small-pox and cholera. The mean urban death rate was 36·23 per thousand compared with a rural death rate of 37·82 per thousand. The highest monthly death rate in the province as a whole occurred in December and the lowest in June.

Hindus and Muhammadans died at approximately the same rate, *viz.*, 38·30 and 38·33 per thousand, respectively, Buddhists at 25·87, "Other Classes" at 30·07, and Christians at 25·16 per thousand.

Infants under one year of age died at the rates, respectively, of 204·56 and 193·10 per thousand of males and females born. At all age periods males died at a higher rate than females, the rates approaching each other closely in the age periods 15-20 and 20-30. The general male death rate was 39·03, and the female death rate 36·43 per thousand of the population.

Registration by a professional agency.

The experiment of testing the accuracy of the registration of deaths in a selected area, which was begun in the Galsi *thana* in the Burdwan district of Bengal on the 1st of August 1906, was continued during the year ending the 31st July 1908.

The population of the area as enumerated at the census of 1901 was 51,981 persons: the population as it stood on the 1st August 1906, when the experiment began, was 53,277, and on the 1st August 1907, the beginning of the year under report, it was 52,724.

The results obtained during the first year are given on page 66 of this report for 1906, and those for the year ending the 31st July 1908, are set forth in the statement below.

—	Cholera.	Small-pox.	Plague.	Fever.	Dysentery and Diarrhœa.	Respiratory diseases.	Injuries.	All other causes.	Total.
Number of deaths recorded in the *thana* register.	452	20	...	2,141	150	30	1	301	3,095
Number of deaths according to the investigation.	474	21	...	1,743	430	697	1	341	3,107
Ratio per thousand according to the results in the *thana* register.	8·57	0·38	...	40·61	2·85	0·57	0·02	5·71	58·70
Ratio per thousand according to the results of the investigation.	8·99	0·40	...	21·68	8·16	13·22	0·02	6·47	58·93

As in the first year of the enquiry, the results show that although the error in the actual number of deaths recorded is small, the cause of death is very frequently incorrectly reported. It will be apparent especially that in the hands of the unprofessional agency the heading "fever" does duty for nearly all the cases of death from respiratory diseases and for a considerable number of those from dysentery and diarrhœa.

United Provinces.

The climatic conditions of the year were abnormal. The spring rainfall was in excess, and the weather cooler than usual. The monsoon set in very late and terminated early in September, and thereafter there was little or no rain.

Among a population of 47,691,782 persons, there were 1,963,963 births compared with 1,918,425 in 1906, the birth rates being 41·18 and 40·22 per thousand, respectively, with a quinquennial mean of 44·92. The districts of Shahjahanpur, 54·95, and Hardoi, 54·53, recorded the highest rates, followed by Pilibhit 52·03, while the lowest rates were returned by Naini Tal, 31·78, Ballia, 28·57 and Dehra Dun, 28·52. In Naini Tal the population is composed chiefly of males who go there for domestic service. In municipal areas the birth rate fell from 39·30 in 1906 to 38·19 in 1907, the rates ranging between 57·65 in Sahaswan and 9·16 in Mussoorie. The mean percentage of male to female births was 108·57, practically the same as in the two preceding years: the rates ranged between 115·28 in Muzzaffarnagar and 103·75 in Pilibhit.

The number of deaths during the year numbered 2,072,536, compared with 1,863,336 in 1906, the death rates being 43·46 and 39·07 per thousand, respectively, with a quinquennial mean of 38·12. The death rate exceeded the provincial mean in nineteen districts, but was lower in twenty-nine. The highest district rates

occurred in Muzaffarnagar 87·97, where the plague mortality was 55·70 per thousand, in Saharanpur 75·99 where plague accounted for 23·97 per thousand and fever for 50·56 per thousand of the deaths, and in Bijnor 64·80 where the plague and fever death rates were 16·32 and 40·92. The lowest rates were recorded in Jaunpur, 30·09, Garhwal 28·72 and Dehra Dun 26·91. In rural areas the mean rate was 42·57 ranging between 87·58 in Muzaffarnagar and 24·12 in Dehra Dun, compared with a mean rate of 55·46 in towns where the range was very great—Mawana, 156·62, and Kairana, 142·87, recorded high rates owing chiefly to plague, while the low rates of 17·04 and 10·70 were recorded in Naini Tal and Mussoorie. The highest mortality by months was recorded in April, and the lowest in August.

Hindus died at the rate of 43·07, Muhammadans at 47·01, "Other Classes" at 13·73, and Christians at 10·78 per thousand of population, respectively.

Male and female infants under one year of age died at the rates, respectively, of 254·7 and 251·6 per thousand born, and boys and girls between one and five years of age at the rates of 80·32 and 79·23. At all age periods, except 1-5, 40-50, 50-60 and 60 and over, females died at a higher rate than males, the general rate being 42·61 for males and 44·36 for females.

Punjab.

The rainfall during January was much less than usual, except in the hill districts. During the next three months the weather was stormy, cloudy, wet and cold, the rainfall being in large to very large excess. After this there was no rainfall of any importance till widespread rain occurred in the south-west and central Punjab in the first week of June. From the 20th July till the 24th August monsoon conditions prevailed which terminated abruptly, and thereafter to the end of the year no rain of any importance whatever fell, and temperature, with one or two exceptions, was above the normal throughout the period. The adverse weather conditions affected the crops and there was a very considerable rise in the prices of food grains during the latter part of the year, and wages showed a corresponding increase in certain districts.

The registration of vital statistics is conducted among a population of 20,108,690, returned at the census of 1901. The total births numbered 819,571 or 58,435 fewer than in 1906, which gives a ratio of 40·8 per thousand. This is lower than the rate of 43·7 recorded in 1906 and 43·3, the average of the preceding five years, and marks the lowest ratio recorded since 1902. The extent of the fall varied in different districts and was as high as 10·5 per thousand in Ambala. The decreased birth rate is attributed to the great prevalence of plague during 1907 and malarial fever in certain parts in the preceding autumn. It is remarked by the provincial Sanitary Commissioner that the effect of plague on the birth rate does not appear as appreciable as that of excessive autumnal sickness, as the number of deaths due to plague indicates closely the amount of sickness due to the disease, whereas the number of deaths from fever gives very little idea of the extent of sickness and incapacity resulting from malaria.

The highest district birth rate was 68·2, recorded in Lyallpur: the rate is, however, misleading as the population of the district has largely increased since the census of 1901, and if the figures of the recent special census are taken, the ratio comes to 54·4 per thousand, which however still leaves the rate as the highest during the year. The next highest rates were recorded in Shahpur and Multan which closely approximate, *viz.*, 45·9 and 45·6. Two districts recorded rates below

30 per thousand, Ambala 29·7 and Simla 21·4: the conditions of the latter are peculiar as males preponderate in the population. In towns the birth rate was not affected by the adverse conditions prevailing in the province generally, as the rate of 39·1 was little below the quinquennial average of 39·7. The mean proportion of male to female births was 110·5 to 100. The greatest excess of male births was 121·7 in Dera Ghazi Khan, rates of 115·2, 115·1 and 115·0 being recorded in Mianwali, Muzaffargarh and Jhelum, while the lowest rates were recorded in Delhi, 106·8, and Ludhiana 106·1.

The number of deaths recorded during the year amounted to 1,248,729 or 505,823 more than during the preceding year. The ratio per thousand of the population was 62·1 compared with a ratio of 36·9 in 1906 and 45·3 the average of the preceding quenquennium. Of the total deaths, nearly half, 30·3 per thousand, were accounted for by plague and 20·2 were ascribed to fever. The death rate of the year is the highest on record since the commencement of registration in the Punjab forty-one years ago, and is due to the severe epidemic of plague, but for which the death rate would have been only 31·8 per thousand.

In thirteen districts the death rate exceeded the provincial mean of 62·1, the districts of Gujrat and Gujranwala heading the list with rates of 104·3 and 99·7, followed by Shahpur, Sialkot, Rohtak, Jhelum and Rawalpindi, where the rates ranged between 90·7 and 80·2, and Ambala, Jullundur, Lahore, Gurdaspur, Ferozepore and Delhi where they ranged between 73·9 and 63·1. These thirteen districts together registered a death rate of 79·3 of which 48·6 was due to plague. In the other sixteen districts the rate was 30·7 or 3·3 below the quinquennial average of 34·0, excluding plague. The lowest rates in districts were recorded in Simla, Muzaffargarh, Dera Ghazi Khan, Multan, Kangra, Jhang and Mianwali, where the rates ranged between 22·4 and 33·8 per thousand, and with the exception of Jhang, represent areas that have been only slightly affected by plague. In these districts there was a death rate from this disease of only 0·08 per thousand. The mean rural death rate was 62·93 compared with an urban rate 54·65. The rural rate ranged between 106·67 in Gujrat and 19·02 in Simla and the urban rate between 144·31 in Dinga (Gujrat district) and 12·15 in Khangah Dogran (Gujranwala district). The highest monthly mortality was recorded in May, and the lowest in August.

Muhammadans died at the rate of 67·05 per thousand, showing an increase of 10·77 over the rate of 56·28 registered among Hindus. Christians died at the rate of 60·83, while for the rate of 143·05 among "Other Classes" it is stated that the figures are incorrect owing to misclassification.

Male and female infants died at the rates, respectively, of 244·0 and 248·0 per thousand born, and boys and girls between one and five years of age at the rates of 75·83 and 80·66 per mille of the census population. At all age periods the female death rate was in excess of the male death rate, the mean for the province being 59·0 for males and 65·7 for females.

North-West Frontier Province.

The rainfall was generally below the average, but prices were on the whole lower than during 1906. In the Dera Ismail Khan district prices were higher, whereas in the Kohat district the tendency was for them to fall at the close of the year.

The population under registration numbers 1,908,184, excluding certain tracts in the Hazara district. Among this population there were 62,062 births or 14,772 fewer than in the preceding year which reduced the birth rate from 38·6 to 32·5, the quinquennial mean being 36·3. The decrease is attributed largely, if not entirely, to severe malaria in the autumn and winter of 1906, followed by a heavy death rate from chest complaints during the colder months. The Hazara district recorded the highest rate, 36·7, which was 0·4 lower than the rate in the previous year and Dera Ismail Khan the lowest, 27·0, which is 9·2 below the rate recorded in 1906. The percentage of male to female births was 120·4, ranging from 133·9 in Peshawar to 111·3 in Hazara. These high percentages are believed to be due to the omission to register the births of many females.

The number of deaths registered during the year numbered 67,017, showing a decrease of 132 compared with the preceding year. The death rate was 35·1 per thousand compared with 33·7 in 1906: the apparent discrepancy in the rates and actual numbers, in the two years, is explained by the fact that the population of certain tracts not under registration in the Hazara district has been excluded from the figures for this year. The increased death rate is also attributed to heavy mortality during January and February and again in November and December, in the two earlier months due to the severe malarial epidemic in the autumn of 1906, and in the two later months to an unusually early and severe onset of cold weather which acted unfavourably upon those suffering from autumnal fever. The highest rate, 40·3, was recorded in the Dera Ismail Khan district, where the fever death rate was 31·3, and the lowest, 32·2, in Peshawar, where the fever death rate was also high, *viz.*, 25·1. In rural areas the mean rate was 35·04 and in towns, 36·0, among which Buffa (Hazara district) recorded the high rate of 58·47, of which 38·27 was due to fever, and 42·35 in Lakhi (Bannu district) of which 32·58 was due to the same cause. The lowest rate, 13·81, was recorded in Kulachi (Dera Ismail Khan district). January was the most unhealthy month and August the healthiest month.

Muhammadans had the highest death rate, *viz.*, 35·76, followed by Hindus with a rate of 28·34, "Other Classes" 24·32, and lastly Christians with a rate of 8·28.

Male and female infants died at the rates, respectively, of 230·60 and 225·08 per thousand born; and boys and girls between one and five years of age at 52·13 and 51·63 per thousand, respectively, of the census population at those ages. At all other age periods, except between the age of 15-20, females died at a higher rate than males, the general rates being 34·2 for males and 36·0 for females.

Ajmer-Merwara.

The number of births which had been 13,789 in 1906 increased to 14,881 in 1907, and the ratio per thousand rose from 28·91 to 31·20, against the quinquennial mean of 33·06. The percentage of male to female births was 118·68.

The number of deaths fell from 15,367 in 1906 to 14,731 and the death rate from 32·22 to 29·63 which is below the quinquennial mean of 31·13. The death rate in Ajmer was 30·78 and in Merwara 25·75. The mean rural rate was 25·46 as compared with the urban rate of 40·78, the latter ranging between

61·02 in Ajmer Suburb and 25·52 in Nasirabad. The highest monthly mortality was recorded in December, and the lowest in July.

Muhammadans and Hindus died at the rates of 33·17 and 30·70, respectively, and "Other Classes" at 2·58 per thousand.

Male infants died at the rate of 236·87 and female infants at the rate of 236·30 per thousand born, and boys and girls between one and five years of age at 120·87 and 122·63 per thousand of the census population at those ages. At the age periods between 5 and 40, the female death rate exceeded that of the males, but over 40 the position was reversed. The mean death rate was 29·09 for males and 30·22 for females.

Central Provinces.

The total rainfall was in considerable defect compared with the average, except in the districts of Nagpur and Yeotmal, and here the excess was but slight. The monsoon was established later than usual and ceased early at the end of August, and in this month more than half the rainfall of the year was received. There was consequently a failure of the crops and a rise in the price of food grains, which showed a further rise at the close of the year.

The population under registration numbered 11,884,340 persons among whom were recorded 623,529 births, or 8,913 more than during the preceding year, increasing the ratio per thousand from 51·72 to 52·46, compared with 50·47 the mean of the previous five years. In seventeen out of twenty-four districts the rate exceeded 50 per thousand, the highest rate (59·80) being recorded in Saugor and the lowest (47·07) in Bhandara. In rural areas the birth rate was 53·85 compared with the rate of 40·44 in the towns, the difference being explained by more careful registration in rural than in urban circles, the better physique and healthier condition of the country women, the higher proportion of adult women to men in the country places and also to the migration from towns to the country on account of plague, as well as the custom a woman has of returning to her home for her confinement. Nevertheless high rates were recorded in some of the towns, *viz.*, Barur 79·12, Sendurjana 75·33 and Nerpinglai 62·31, all in the Amraoti district. The percentage of male to female births was 105·32 for the province, the rates ranging between 112·44 in Burhanpur and 100·79 in Mandla.

The total deaths registered numbered 495,603 or 21,010 fewer than in 1906, the ratio per thousand falling from 43·47 in that year to 41·70, which is however in excess of the quinquennial average of 35·21. In three districts the rate exceeded 50 per thousand, the highest rate (58·32) being recorded in Buldana, where plague (10·84 per thousand), dysentery and diarrhœa (11·09) and respiratory diseases (4·27) caused many deaths, and a high rate (23·52) was returned under 'all other causes'. Ten districts returned rates under 40 per thousand, the lowest of which (32·37) was recorded in Bhandara. The mean death rate in rural circles was 41·30 as compared with 45·11 in towns, among which the highest rates were recorded in Belgaon (Amraoti) 93·28 per thousand, Deori (Saugor) 85·14 and Anjangaon (Amraoti) 83·45, in all of which the death rate from plague was very high. At the other end of the scale came Arang, 22·15 and Rajim, 19·76, both small towns in the Raipur district. The most unhealthy month of the year was September and the healthiest month July.

Muhammadans and Hindus died at the rates of 44·27 and 37·71, respectively, and "Other Classes" at the rate of 68·22. It, is, however, stated that the classification by religions in these provinces is not reliable.

Male infants died at the rate of 284·79 and female infants at 257·91 per thousand born. The general death rate among males was 43·77 and among females 39·67 per thousand calculated on the census population. Owing to changes in the rearrangement of the districts, the figures of population by age and sex are not available, but it is stated that the female death rate was less than the male death rate at all age periods except between 15 and 30 and over 60 years of age.

Bombay.

The rainfall of the year was irregularly distributed and the monsoon failed in the autumn, with the result that the prices of food grains were high and specially so during the two closing months of the year.

The population under registration, excluding Europeans and Eurasians, numbered 18,481,362 persons. The total number of births fell from 625,486 in 1906 to 610,533 in 1907, and the birth rate from 33·84 to 33·03 per thousand, the average of the preceding quinquennium being 33·47. The highest rate was recorded in the West Khandesh district, 55·95, the East Khandesh district coming next with a rate of 51·29, followed by the Panch Mahals district with 45·52. On the other hand the lowest rates were recorded in the districts of Larkhana, 18·95, Upper Sind Frontier 14·91, and Hyderabad (Sind) 14·66. The birth rate in rural areas was 34·08 per thousand compared with 20·24 in towns, the highest rate among the latter being 52·11 in Karachi, three other towns returning rates in excess of 40 per thousand. The mean percentage of male to female births was 107·90. In the Bombay districts the rates ranged between 113·19 in Kaira and 101·59 in Broach, but in the Sind districts the variation was between 141·79 in Hyderabad and 112·81 in Karachi.

The total number of deaths fell from 648,019 to 606,606 and the death rate from 35·06 to 32·82, compared with the quinquennial mean of 38·25. All, except six districts, shared in the smaller rate of mortality, and the highest rates recorded were 56·76 in Satara, 47·22 in Kaira and 43·81 in Ahmedabad, while the lowest were returned by Thar and Parkar, 21·10, Hyderabad, 19·46 and Upper Sind Frontier, 17·85. In rural areas the death rate was 31·54 compared with a rate of 38·19 in towns among which are Dholka (Ahmedabad) with a rate of 82·36, including 29·12 from plague, 24·18 from fever and 15·30 from "all other causes;" Pandharpur (Sholapur) 72·02, including 39·96 from cholera and 10·89 from dysentery and diarrhœa; and Wai (Satara) where the rate of 70·13 included 58·33 from plague. The lowest rates were 14·32 in Ahmedabad Cantonment, 13·13 in Kaladgi (Bijapur) and 10·43 in Godhra (Panch Mahals). The month of highest mortality was October and the lowest June.

Hindus died at the rate of 35·14 followed by Jains with a rate of 30·71 and then came Muhammadans, Parsis and Christians with rates of 24·33, 23·96 and 22·10, respectively. "Other classes" died at the rate of 52·45.

Male and female infants died at the rates, respectively, of 207·33 and 190·10 per thousand born, and boys and girls over one and under five years of age at 53·91 and 51·85 per thousand, respectively, of the census population at those ages.

Females died at a higher rate than males at the age periods 5—10, 10—15, 15—20 and 20—30; at the other age periods the male rates were the higher. The mean death rate for the province was 32·94 for males and 32·70 for females.

Coorg.

The number of births registered fell from 4,713 in 1906 to 4,304 in 1907, and the birth rate from 26·10 to 23·83, the quinquennial mean being 24·76 per thousand. The birth rate ranged from 37·56 in Padinalknad to 17·15 in Mercara, the same places occupying the highest and lowest places in the previous year. The percentage of male to female births was 120·18 in Mercara and 99 in Yedenalknad, and elsewhere between these two rates.

The number of deaths increased from 5,285 in 1906 to 6,349 in 1907, and the death rate which for the quinquennium was 28·12 per thousand, increased from 29·26 in 1906 to 35·15 in 1907. In districts the highest rate was 44·23 in Padinalknad and the lowest 31·12 in Yedenalknad. The mean rate in rural areas was 34·34 compared with 44·01 in towns, among which Virajendrapet recorded the high rate of 68·64, of which very nearly half was recorded under "all other causes," the next highest being the rate of 35·96 in Nanjarajpatna. The highest rate of mortality was recorded in June and the lowest in February.

By classes the death rates were for Hindus, 34·40, Muhammadans, 33·91 and "Other Classes," 54·51.

Male and female infants died at the rates, respectively, of 302·91 and 254·71 per thousand born, and boys and girls between one and five years of age at 51·26 and 46·07 per thousand of population at those ages. Except at the age periods 10—15 and 60 and above, the female death rate was in excess of the male death rate. The mean for the province was 34·44 for males and 36·04 for females.

Madras.

The rainfall during the year, although slightly in excess of the average for the Presidency as a whole, was in excess of the normal in eight districts, and below the normal in fifteen others. The prices of food grains which had risen in the previous year showed a further increase and were in excess of the average. The persistent rise is attributed to a demand, probably for export, in excess of the yield, and not necessarily to unfavourable meteorological conditions.

The population under registration was 36,362,222 and excludes the hill tribes of the Ganjam and Vizagapatam districts, the Banganapalle estate in Kurnool and the Laccadive and Amindivi Islands. The total births numbered 1,119,170 or 6,808 fewer than in 1906, giving a birth rate of 30·8 per thousand which is only 0·1 less than in the previous year, but 0·2 above the quinquennial mean. The highest rates recorded in districts include Madras 39·1, Guntur 37·3, and Chingleput 35·6, while the lowest rates were returned by Coimbatore, 26·2, Vizagapatam, 26·0, and Madura, 23·1. In fifteen districts, however, the rate exceeded 30 per thousand. The mean birth rate in rural areas was 30·6 against 32·1 in towns among which the highest rate 81·5 was returned by Siruguppa in the Bellary district with a population of something below 6,000 souls, the next highest rate of 57·8 being recorded in Vaniyambadi in the Salem district. The low rates of 6·7 and 6·4 were recorded in Rajampet (Cuddapah) and Tuni (Godavari), respectively.

The percentage of male to female births for the Presidency as a whole was 104·9, but in the districts ranged between 115·4 in the Nilgiris and 101·2 in Anantapur.

The number of deaths was 883,016 which is 115,375 less than in the preceding year and the death rate 24·3 against 27·4, but still higher than the quinquennial mean of 22·7. The death rate was lower in all but four districts and is attributed generally to cholera having prevailed to a less extent than in the previous year. Excluding the Madras district where the death rate was 40·8, the highest district rates were recorded in South Canara (36·8) and Malabar (36·7), the lowest being recorded in Nellore (18·4) and Madura (18·3). The mean death rate in rural areas was 23·7 as compared with 28·5 in towns: among the latter the high rate of 66·4 was recorded in Cochin (Malabar) where no less than 28·7 of the total was due to cholera alone, and 21·7 to "all other causes." The town of Siruguppa (Bellary) recorded the next highest rate, 53·2, of which 37·9 was under the general heading 'all other causes'. Elsewhere the rates ranged between 51·3 in Tuticorin (Tinnevelly) and 4·5 in Rajampet (Cuddapah). The most unhealthy month was December and the healthiest month April.

By religions the death rates were:—Muhammadans 28·4, Hindus 24·1, Christians 21·5, and "Other Classes" 15·5.

Calculated on the births of the year, male infants died at the rate of 185·5 and female infants at the rate of 168·1 per thousand born. Boys and girls between one and five years of age died at the rates of 33·4 and 32·0 per thousand of the census population. Except at the age periods 10—15, when both sexes died at the same rate, and the periods 15—20 and 20—30 when the female death rate was the higher, the males died at a higher rate. For the Presidency as a whole the male and female death rates were 25·1 and 23·5, respectively.

History of the Chief Diseases.

(For Statistical Tables, *see* pages 154 to 160.)

87. The accompanying table shows at a glance the number of deaths, and the death rates per thousand of population, recorded in British territory in India during each of the five years from 1903 to 1907. On comparing the figures for the year under review with those for the previous year it will be seen that in 1907 there was a considerable decrease in the number of deaths attributed to cholera, small-pox, and dysentery and diarrhœa, but that there was a small increase in the mortality recorded as due to fevers and an unprecedented increase in the mortality due to plague. From all causes taken together there were recorded in British territory 547,293 more deaths than in 1906.

Years.	Cholera.	Small-pox.	Fevers.	Dysentery and Diarrhœa.	Plague.	All causes.
1903	312,854	93,693	4,459,237	223,459	686,485	7,881,125
	1·38	·41	19·66	1·21	3·03	34·7
1904	192,835	55,232	4,093,981	240,655	940,609	7,436,472
	·85	·24	18·09	1·06	4·16	32·86
1905	441,786	70,962	4,417,655	264,124	940,821	8,117,771
	1·96	·31	19·57	1·17	4·17	35·96
1906	690,519	109,583	4,452,842	298,117	300,355	7,852,330
	3·05	·48	19·69	1·32	1·33	34·73
1907	408,102	103,988	4,464,881	282,191	1,166,223	8,399,623
	1·81	·46	19·76	1·25	5·16	37·18

Cholera in India in 1907.
Appendix A to Section VI.

The number of deaths from cholera recorded in British territory during 1907 was 408,102, equal to a death rate of 1·81 per thousand of the total population under registration. If the deaths recorded in the native states from which returns were received are added (Statement I), the total amounts to 413,552. In the previous year 690,519 deaths from cholera were recorded in British territory, giving a ratio of 3·05 per thousand of population, so that during the year under review cholera was very much less prevalent than in 1906. The decrease in mortality during 1907 was shared by all the British provinces except Bengal, Coorg and Lower Burma. The greatest numbers of deaths from the disease were recorded in Bengal, Madras, Eastern Bengal and Assam and the United Provinces and the highest death rates in Bengal, Eastern Bengal and Assam, the Madras Presidency and Lower Burma. In all provinces except the Punjab, the North-West Frontier Province, Coorg and Ajmer-Merwara, cholera was prevalent throughout the year. The seasonal prevalence varied widely in the different provinces; in Bengal, the Punjab and the Central Provinces and Berar the greatest number of deaths occurred in September, in Eastern Bengal and Assam in January, in the United Provinces in October, in Madras in December, in Bombay in July, in Lower Burma in March and in Upper Burma in November; and fewest deaths

occurred in May in Bengal and the United Provinces, in August in Eastern Bengal and Assam, in March in the Punjab, in June in the Central Provinces and Berar, in April in Madras, in December in Bombay, and in July in Lower Burma.

Cholera in Burma.

In Lower Burma there were recorded as due to cholera 7,964 deaths, equal to a ratio of 1·43 per thousand of population, as compared with 5,529 deaths or ·99 per thousand from the same cause in 1906. Deaths from cholera were recorded during each month of the year, the highest number occurring in March and the lowest number in August. The highest death rates per thousand of population recorded in districts were 4·32 (383 deaths) in Mergui, 2·75 (1,326 deaths) in Akyab, 2·13 (843 deaths) in Tharrawaddy, and 2·04 (612 deaths) in Amherst; in towns the highest death rates were 14·42 in Kyaiklat, 12·21 in Bassein, 11·24 in Danubyu, 9·50 in Nyaunglebin, and 9·20 in Pegu.

In Upper Burma the total number of deaths recorded as due to cholera during 1907 was only 414, equal to a ratio of ·14 per thousand of population, as compared with 2,343 or ·80 per thousand from the same cause in 1906. Three out of the 11 districts were entirely free from the disease and in four others the number of deaths in each did not exceed ten. Steps have been taken by the Local Government to prevent as far as possible the pollution of rivers in the neighbourhood of towns and villages.

Cholera in Eastern Bengal and Assam.

The number of deaths attributed to cholera in Eastern Bengal and Assam during 1907 was 77,181 equal to a ratio of 2·58 per thousand of the census population, as compared with 108,278 deaths or a ratio of 9·63 in 1906. January was the month of greatest prevalence. The highest death rates were recorded in the districts of Rajshahi (8·75), Bakarganj (6·03), and Noakhali (5·79). In the two latter districts cholera is always more or less prevalent; they are situated side by side at the head of the Bay of Bengal, are low-lying, and in many parts of them the difficulty of obtaining a supply of pure drinking water is very great.

Cholera in Bengal.

In Bengal the total number of deaths recorded as due to cholera was 205,702 or 4·07 per thousand of population, as compared with 192,596 or 3·81 per thousand in 1906 and 138,999 or 2·75 per thousand the average figures for the five years 1902-06. No district was entirely free from the disease and 500 out of 529 registering circles were affected, against 496 and 478 in the two preceding years. The highest mortality was recorded in the Cuttack district where 31,805 or 15·41 per thousand of the population died from this cause, against 10,789 (5·22 per thousand) in the previous year; next in order came Palamau with 8,321 deaths (13·42 per thousand), Balasore with 11,030 (10·29), Puri with 9,197 (9·04), and Purnea with 16,063 (8·56). Champaran, which stood second on the list last year, now occupies the last place but one, Ranchi being the least affected of all the districts. The disinfection of wells was carried on with good results and it is said that the people are gradually beginning to appreciate the value of this measure.

The months of greatest prevalence of the disease were September and December and the months of least prevalence May and June.

The towns with the highest death rates from cholera were Chatra in the Hazaribagh district (44·15 per thousand), Katihar in Purnea (20·28), Nadia (18·75), Gaya (15·34), Deoghur in Sonthal Parganas (15·27), Daltonganj in Palamau (14·04), Puri (12·95), Kendrapara in Cuttack (12·79), and Purnea (12·77). In rural areas the highest death rate, 40·75 per thousand, was recorded in Purnea.

Among the European seamen of the port of Calcutta there were two deaths from cholera, and there were 65 among the native floating population.

Cholera in the United Provinces.

The total number of deaths from cholera recorded in the United Provinces was 22,438, equal to a ratio of ·47 per thousand of population, as compared with 149,549 and a ratio of 3·14 in 1906. The average death rate of the preceding quinquennium was 1·47. The greatest number of deaths occurred in October and the smallest number in May. No death from cholera was reported during the year in two—Meerut and Hamirpur,—out of the 48 districts, and three others,—Garhwal, Muzaffernagar and Jalaun—were also practically free, the number of deaths returned being two in each case. The highest death rates for this disease recorded in towns were 5·93 in Sahatwar (Ballia), 3·96 and 3·01 in Sikandra Rao and Hathras (Aligarh District) respectively and 2·88 in Ballia. Of the 106 towns with populations of 10,000 or more, no death from cholera was reported in 45, while in 31 of the remainder the number reported did not exceed ten. The urban and rural mortality were less than in the previous year, the rates being ·41 and 1·59 against ·47 and 3·25, respectively.

Cholera in the Punjab.

In the Punjab the total number of deaths recorded as due to cholera was only 437 (·02 per thousand of the population) against 4,232 (·21) in the previous year and ·22 the mean of the quinquennial period ending with 1906. Out of a total of 32,834 towns and villages, only 67 were affected by cholera, but excepting in a few localities the disease did not prevail anywhere in a serious epidemic form. No death from cholera was reported to have occurred during January, February and April, and only two deaths were reported in March, of which one was in the Amritsar and the other in the Shahpur district; September, as in the previous year, was the month of maximum prevalence, when 154 deaths were registered. The largest number of deaths occurred in the Gujranwala district (162, including 125 in the town), Lahore coming next (66, of which 26 were in the Punjab Lunatic Asylum, Lahore), and the lowest in the Montgomery and Multan districts (one only in each). Of the 144 municipal towns in the province, cholera was reported from only 19. It is stated that at the Sun Eclipse Fair, held at Thanesar on the 14th January 1907, which was attended by more than 200,500 pilgrims, no case of cholera occurred. The outbreak at the Lunatic Asylum was of a virulent and rapidly fatal type. It began on the 6th November and ceased on the 3rd December during which period 26 cases (all fatal) occurred. In the opinion of the Superintendent of the Asylum, the epidemic was one of *cholera sicca*. The epidemic is said to have originated by the female inmates drinking filthy water from a *dhobi* tank in which a newly-admitted patient suffering from cholera had bathed.

Cholera in the North-West Frontier Province.

In 1906 no case of cholera was reported to have occurred in this province, but in 1907 there were recorded 266 deaths of which ten were in the Hazara district, 39 in Peshawar and 217 in Kohat. The cases in the Kohat district occurred

during September, October and November, the month of greatest prevalence being October; in the other two districts, all the cases occurred in November, except one case at Nowshera (Peshawar district) in July. The introduction of the disease was attributed to a cholera infected traveller who came from down country to a village in the Kohat district. The disease spread from this village to others and to the municipal town of Kohat. In the Peshawar district the disease was imported by a man from Kohat, but the outbreak in the Hazara district could not be traced to importation.

Cholera in Ajmer-Merwara.

In Ajmer-Merwara only one death from cholera was recorded during 1907 as compared with 284 deaths in 1906. No death from this disease had been recorded during the years 1903 to 1905.

Cholera in the Central Provinces and Berar.

In the Central Provinces and Berar the total number of deaths recorded as due to cholera was 4,291, or ·36 per thousand of the population, as compared with a total of 38,768 and a ratio of 3·26 per thousand in 1906. Of the total number in the year under review, 3,022 (equal to a ratio of ·33 per thousand of the population) were recorded in the Central Provinces and 1,269 (·46 per thousand of the population) in Berar. Of the 26 districts in the Central Provinces, four only, *viz.*, Murwara, Hoshangabad, Mandla and Betul were free from the disease; of the sixteen infected districts Nagpur with 890 deaths, Raipur with 595, Wardha with 341, Drug with 392 and Bilaspur with 301 suffered most severely.

In Berar all four districts were affected, Buldana with 515 and Akola with 437 deaths having the highest mortality. In the province as a whole the months of greatest prevalence were September and August and those of least prevalence June and December.

Cholera in Bombay.

In the Bombay Presidency there were recorded as due to cholera 7,656 deaths, equal to a ratio of ·41 per thousand of population, as compared with 46,119 deaths or a ratio of 2·50 per thousand in 1906. During the last twenty years the mortality from this disease has on only five occasions been lower than in the year under report. Of the 26 districts, eight were entirely free from the disease, and five others were only slightly affected. The highest death rates were recorded in Sholapur (2·98 per thousand of population), Bijapur (1·26), Ahmednagar (·91) and Poona (·65). The highest mortality occurred during July and August and the lowest in December and February.

Deaths from cholera were recorded in 24 of the 56 town circles in the Presidency, as compared with 42 in 1906; the highest rates per thousand being 39·96 in Pandharpur (Sholapur), 2·54 in Gokak (Belgaum), 1·63 in Nasik and 1·50 in Alibag (Colaba). In the City of Bombay and in Poona 431 and 91 deaths respectively were recorded as compared with 1,223 and 573 in the previous year.

The Deputy Sanitary Commissioner reported in connection with the epidemic in the Southern Registration District that there was no evidence to show how the infection was introduced into Bijapur *zilla*. The epidemic started on the 7th January in a village in the Badami *taluka*, within three days it spread to two more villages and thence the infection spread upstream, showing in the majority of instances that it was carried by man. In the Indi *taluka* the epidemic commenced simultaneously in seven villages at the end of July and it

is quite possible that the infection came to this *taluka* from the Pandharpur fair, as the date of infection coincided fairly closely with the exodus of people from the fair.

The Acting Deputy Sanitary Commissioner of the Central Registration District observes that the disease began in February with four cases each in Ahmednagar and Poona but it was not until July when 2,161 deaths were reported, that a large number of deaths occurred. Of this number 1,731 occurred in the Sholapur district and it appeared probable that the large gathering of pilgrims for the Ashadi fair in Pandharpur was responsible for much of the cholera in this district, as the fair was held in June.

Cholera in Coorg.

In Coorg 187 deaths from cholera were recorded during 1907, giving a ratio of 1·04 per thousand of population. The province had been entirely free from the disease in the four years prior to 1906 when ten deaths were reported.

Cholera in Madras.

In the Madras Presidency in 1907 there were 81,565 deaths recorded as due to cholera, giving a ratio of 2·2 per thousand of population, as compared with a total of 142,811 and a ratio of 3·9 per thousand in 1906. Deaths from cholera were reported from all the districts in the Presidency and the disease was present throughout the year in 11 of the 23 districts. The highest death rates recorded in districts were 8·5 in Malabar, 4·9 in Anantapur, 4·4 in South Arcot, 4·3 in South Canara, 3·1 in Tanjore, 2·9 in Trichinopoly and 2·0 in Madura. In the Bellary district only 19 deaths were recorded, in the Kurnool district 64 deaths and in the Nilgiri district 95 deaths. The months of greatest prevalence were December and August, in which no less than 13,931 and 10,872 deaths, respectively, occurred, and the lowest numbers of deaths 2,872 and 3,337 were recorded in April and May.

The highest death rates from cholera recorded in towns were 28·7 in Cochin, 22·0 in Devakkottai, 20·6 in Abiraman, 14·8 in Tuticorin and 13·5 in Ponnani; while Ongole, Kurnool, Nandyal, Kodaikanal, Coonoor and Tirupati were free from the disease. Out of 43,232 towns and villages in the Presidency, deaths from cholera were reported from 6,430 as against 11,212 in 1906.

The purification of contaminated sources of water-supply by permanganate of potash was favourably reported on.

Small-pox. Table I of Appendix B to Section VI.

From the marginal statement in the first paragraph of this section it will be seen that in British territory in India the death rate per thousand of population from small-pox fell from ·48 in 1906 to ·46 in 1907. The mean ratio for the quinquennial period from 1902-1906 was ·39. The total number of deaths recorded from this disease during 1907 was 103,988 against 109,583 in 1906 and 70,962 in 1905. In the Punjab, the North-West Frontier Province, the Central Provinces and Berar, Lower Burma, Madras, Bombay and Coorg, the death rates were lower than in 1906, the decrease being greatest in the Central Provinces and Berar and Lower Burma. The small-pox mortality recorded in towns was almost the same as that in rural areas; and the deaths of children under ten years of age amounted to 69·70 per cent. of the total number of deaths from this cause.

In Burma the number of deaths from small-pox fell from 8,540 in 1906 to 2,882 in 1907. In Lower Burma 6,371 fewer deaths occurred than in the previous year while in Upper Burma there was an increase of 713. The largest number of deaths occurred in April and May and the smallest in October and November. The highest death rates were recorded in the Akyab and Toungoo districts in Lower Burma and the Pakkoku and Yamethin districts in Upper Burma.

In Eastern Bengal and Assam during 1907, small-pox caused 8,693 deaths, equal to a death rate per thousand of ·29 against 6,972 deaths and a ratio of ·23 in 1906. The highest rates in districts were reported from Kamrup (3·48) and Darrang (3·33). In the former, the number of deaths reported (2,051) was higher than in any previous year. In towns the highest death rate (9·15) was again recorded in Barpeta, the head-quarters of the Mahaparushiyas, who, on religious grounds object to vaccination. The Civil Surgeon of the Kamrup district reports, however, that the sect are yielding to persuasion and that endemic small-pox in Barpeta is at last diminishing. In the Cachar district only two deaths were reported.

In Bengal the number of deaths from small-pox rose from 22,206 (·43 per thousand) to 29,066 (·57 per thousand) in 1907; the mean death rate during the quinquennial period ending with 1906 was ·45 per thousand. Puri is the district where the mortality from small-pox is usually highest but in 1907 the recorded death rate was only 2·95 as compared with 4·85 in 1906. In towns 3,366 deaths and in rural areas 25,700 deaths from small-pox were registered as compared with 4,438 and 17,768 respectively during the previous year. Among children from five to ten years of age the mortality was slightly higher than in 1906 but among children between one and five years it was lower than in that year.

In the United Provinces in 1907 there were 22,645 deaths from small-pox against 13,202 in 1906, and 3,273 in 1905, the corresponding rates being ·47, ·28, and ·07 per thousand of population. The average rate for the quinquennial period was ·21. The districts with the highest death rates were Pertabgarh (2·15), Sultanpur (1·99), Hardoi and Gonda (each 1·85), Rai Bareli (1·50), Budaun (1·20), and Gorakhpur (1·08). Four districts—Garhwal, Muttra, Jhansi and Jalaun were practically free from this disease during the year. No death from small-pox was recorded in 42 of the 106 towns with a population of 10,000 and upwards, while in 49 the number did not exceed ten.

In the Punjab 11,082 deaths from small-pox, equal to a ratio of ·55 per thousand were registered during the year, as compared with 13,239 deaths and a ratio of ·66 in 1906, and ·55 the mean ratio during the preceding quinquennium. The highest rates in districts were 1·7 in Gurgaon, 1·29 in Jhelum, 1·23 in Jhang, and ·94 in Amritsar. The death rate in the 28 towns in which vaccination is compulsory was ·93 per thousand, compared with 1·72 in towns in which vaccination is optional.

In the North-West Frontier Province the number of deaths recorded as due to small-pox fell from 1,127 (·57 per thousand) in 1906 to 769 (·40 per thousand). The great majority of deaths (668) occurred in the Peshawar district. The disease prevailed during every month of the year in the Hazara and Peshawar districts, the months of greatest prevalence in the province as a whole being

November and December. In the city of Peshawar where the Vaccination Act has not been brought into force, a death rate of 80 per thousand of population was recorded.

In Ajmer-Merwara 497 deaths (1·04 per thousand) from small-pox were recorded during 1907 as compared with 271 (·57 per thousand) in 1906.

In the Central Provinces and Berar there were 3,826 deaths from small-pox, equal to a ratio of ·32 per thousand of population, as compared with 9,889 deaths and a ratio of ·83 in 1905 and ·45 the mean ratio during the preceding quinquennium. Of the total number of deaths 2,814 were of children under ten years of age. The largest numbers of deaths were reported in the Mandla (837), Drug (676) and Bilaspur (533) districts.

In the Bombay Presidency the number of deaths from small-pox recorded during 1907 was 1,862 (·10 per thousand of population) against 4,063 (·22 per thousand of population) in the previous year. Deaths were reported from 113 of the 287 registration circles in the Presidency but the disease was chiefly confined to the Western, Central and Southern registration districts, in which 192,259 and 1,371 deaths respectively were recorded, while the Sind and Gujarat districts were practically free. Of the total number of deaths no less than 975 or about 52 per cent. occurred among children under ten years of age. The months of greatest prevalence were March and April. The districts which suffered most severely were Kanara (646 deaths), Dharwar (477) and Belgaum (199) all in the Southern registration district.

In Coorg the number of deaths reported as due to this disease was 211 against 234 in the previous year.

In the Madras Presidency small-pox accounted for 22,455 deaths (·6 per thousand of population) against 29,840 (·8 per thousand) in 1906. In 20 out of the 23 districts the disease was present throughout the year, the highest death rates recorded per thousand of population being 2·7 in North Arcot and 2·5 in South Arcot; in the other districts the rate was below 1 per thousand. Of the 61 municipal towns, in 19 no death was recorded and in 23 others the number of deaths reported did not exceed four in each; the highest rates recorded were 2·8 in Mannargudi, 2·2 in Ellore, ·8 in Anantapur and 1·6 in Tiruvannamalai. In urban areas the death rate was ·3 and in rural areas ·6.

Plague.

The great increase in the mortality from plague was the distinguishing feature of the year 1907. The number of deaths recorded from this disease throughout the country rose from 356,721, in 1906 to 1,315,707, the highest total since the beginning of the present epidemic.

In the British Provinces the number of plague deaths registered was 1,166,223 which is more than twice as many as were recorded from cholera and small-pox combined and more than three times as many as occurred in the previous year. The course of the epidemic is shown in comparison with that of the previous nine years in the chart supplied with this report and it will be seen that like the epidemic of 1905 it presented some peculiar features. It was, as usual, at its height during March, April and May, declined rapidly to a very low point during the hottest months and rose with the approach of autumn; but the rise, instead

of continuing steadily throughout the last four months of the year, ceased in October, and the period of least mortality occurred in December. The absence of an autumnal and winter rise was the only hopeful feature in an epidemic of terrible severity for as in 1905 it enabled a prediction to be made that in the coming year the epidemic would be comparatively a mild one. It is fortunate for the country as a whole and for the Punjab in particular that the prediction has been fulfilled.

The mean death rate from plague in the British Provinces was 5·16 per thousand as compared with 1·33 in 1906 the increase being common to all provinces except Eastern Bengal and Assam, Upper Burma and Ajmer-Merwara. It was greatest in the Punjab where 608,685 deaths were recorded against 91,712 in the previous year, the United Provinces where the number of deaths was 328,862 against 69,660, Bombay where the number was 93,609 against 51,525 and Bengal where it was 83,602 against 59,619. In the North-West Frontier Province the number of plague deaths increased from 47 to 1,547, in the Central Provinces and Berar from 18,121 to 37,774 and in the Madras Presidency from 898 to 2,872. Eastern Bengal and Assam, Ajmer-Merwara and Coorg continued to be almost free from the disease.

In the city of Calcutta the mortality rose from 2,606 to 3,591 but in Bombay City it fell from 40,802 to 6,379 and in Madras City from 56 to 3.

Plague in Burma.

The total number of recorded plague deaths rose from 8,637 in 1906 to 9,249 but the increase was confined to Lower Burma, there being a decrease of 137 in Upper Burma. The districts chiefly affected were Rangoon (8·38 per thousand), Amherst (3·44), Henzada (1·54), and Bassein (1·25) in Lower Burma and Mandalay (7·41) and Yamethin (1·13) in Upper Burma. In Lower Burma the mortality rose steadily from January to April in which month 1,009 deaths were recorded and the epidemic then gradually declined. In Upper Burma the heaviest incidence occurred during January and February and in June one death only was recorded. Of the 19 districts in Lower Burma, the three in the Arakan divisison remained free from indigenous plague. In Upper Burma, three out of the 11 districts were entirely free and in a fourth three deaths only were recorded. In towns in Lower Burma the highest death rates were recorded in Minhla (29·48), Myanaung (20·47), Lamyethna (17·55), and Moulmein (16·97), and in Upper Burma in Kyaukse (16·01), Yamethin (14·06) and Mandalay (13·82). In rural areas in Lower Burma 620 deaths only were reported, equal to a death rate of ·13 compared with 7·48 in towns. In Upper Burma the rural death rate was ·07 compared with 9·41 in towns.

Plague in Eastern Bengal and Assam.

Only eight cases of plague were reported in Eastern Bengal and Assam, four of which were of the pneumonic type. The immunity enjoyed by the inhabitants of this province is one of the most notable features of the present epidemic and a comprehensive study of the conditions of life of the people and of the rats might lead to important results.

Plague in Bengal.

In 1907 the total number of deaths from plague in Bengal was 83,602 giving a ratio of 1·65 per thousand of population, against 59,619 and a ratio of 1·17 in the preceding year. Of the total deaths 14,276 were recorded in towns and 69,326 in rural areas. Only six out of the 33 districts enjoyed immunity from the disease.

The Patna and Saran districts which headed the list last year were the worst sufferers again in 1907, recording death rates of 13·45 and 12·45, respectively. Next in order come Shahabad (5·12), Calcutta (4·23), Gaya (3·71), Muzaffarpur (1·50), Monghyr (1·31), and Darbhanga (·88). The districts above named have suffered the most since the appearance of this disease in the province. As regards towns, the highest rates were 42·19 per thousand in Revelganj (Saran), 30·69 in Dumraon (Shahabad), 29·73 in Lalgánj (Muzaffarpur), 25·28 in Roserha (Darbhanga), 22·86 in Gaya and 20·07 in Arrah (Shahabad). There was a localized outbreak of the pneumonic type of the disease in Darjeeling resulting in seven deaths. The first case was imported from Chapra and the only persons who contracted the disease were those who were in immediate attendance on the patients suffering from it. Stringent measures were adopted and the disease was stamped out. From the chart attached to this report it will be seen that the months of greatest prevalence were April (30,970 deaths) and March (23,970) and the fewest deaths occurred in July (306) and October (313).

Plague in the United Provinces.

The number of plague deaths registered rose from 69,660 in 1906 to 328,862 and the death rate from 1·46 to 6·90. The mortality rose rapidly from January, attained its maximum in April (109,619 deaths), fell slightly the succeeding month and attained the minimum in August (310 deaths) after which it gradually rose again. Females, as usual, suffered more than males, the death rates among them being 7·98 and 5·88 respectively. The highest district death rates occurred in Muzaffarnagar (55·70 per thousand), Saharanpur (23·97), Ballia (20·67), Bijnor (16·32), Lucknow (15·75), Meerut (15·04) Budaun (14·51) and Ghazipur (14·22). Almora was the only district entirely free from the disease but in each of six others—Jalaun, Banda, Jhansi, Naini Tal, Hamirpur and Garhwal the number did not exceed ten. Of the 106 towns with a population of over 10,000, only 14 escaped entirely. In rural areas the death rate was 6·33, compared with 14·33, in the towns.

Plague in the Punjab.

The number of deaths attributed to plague in the Punjab was the highest ever recorded, the total having been 608,685 or 30·27 per thousand of population as compared with 104,863 (4·56 per thousand) in 1906. Twenty-seven out of the 29 districts were infected, only Simla and Dera Ghazi Khan escaping. In 14 districts the death rates recorded were over 20 per thousand of population the highest rates being 80·61 in Gujranwala, 70·08 in Gujrat, 62·58 in Shahpur, 57·91 in Sialkot and 55·35 in Rohtak.

In towns the highest rates were recorded in Dinga in Gujrat (119·20), Hodal in Gurgaon (107·10), Eminabad in Gujranwala (96·55), Rohtak (78·87). Of the larger towns Lahore with 5,044 deaths (26·99) and Jullundur with 2,300 deaths (42·24) suffered severely. In rural circles the mean mortality rose from 4·45 in 1906 to 31·76 in the year under report. The months of greatest prevalence were March, April and May, and fewest cases occurred in September and August. The course of the epidemic in this province during the last ten years is shown in the chart attached to this report.

Plague in the North-West Frontier Province.

During 1907 plague became epidemic for the first time in this province. The total number of deaths recorded in all the districts was 1,547, of which the Peshawar district contributed 1,302 giving a death rate of 1·73 per thousand of population; the

District of Dera Ismail Khan coming next with 203 deaths and a death rate of ·82 per thousand. It is said that in the town of Peshawar the origin of the disease was traced to the importation of a dead plague-rat in a consignment of grain. In Peshawar City 381 cases of bubonic plague with 340 deaths were reported by the special plague medical officer but there was reason to believe that many cases were concealed by the people. The first indigenous case in the town of Dera Ismail Khan occurred towards the end of April, and plague established itself during May, June and July and then died out. In all 285 cases with 198 deaths were reported.

Plague in Ajmer-Merwara.

The number of deaths from plague in Ajmer-Merwara fell from 68 in 1906 to 13 in 1907, the death rates among males and females respectively, being ·04 and ·01 per thousand.

Plague in the Central Provinces and Berar.

In 1907 there were 37,774 deaths, more than one half of which occurred in the Berar Division, attributed to plague in these provinces, equal to a ratio of 3·18 per thousand of population, as compared with 18,121 and a ratio of 1·53 per thousand of population in 1906. Of the 24 districts, two, *viz.*, Betul and Bilaspur, were practically free from the disease, and two others, Damoh and Drug, were affected to a very slight extent. The districts of Jubbulpore (death rate 13·14 per thousand) and Buldana (10·84), suffered most severely. In January the number of recorded deaths was 5,383, in February 7,589 and the maximum was reached in March with 11,390; in April the number fell to 4,727 and for the next three months steadily declined, after which there was again a rise until October when the numbers fell to 728 in November and 561 in December. In towns the highest rates were recorded in Jalgaon (57·26), Belgaon (57·15), Anjangaon (48·84) and Damoh (44·34). Males suffered almost as severely as females, the deaths being 19,060 and 18,714 respectively.

Plague in Bombay.

In 1907 the number of deaths from plague was 93,609 equal to a death rate of 5·06 per thousand of population, as compared with 51,525 deaths and a ratio of 2·78 per thousand in 1906 and 8·80 the mean ratio for the preceding quinquennium. The highest ratios recorded in districts were 31·76 in Satara, 17·51 in Kaira, 14·07 in Belgaum, 8·45 in Ahmedabad, and 6·65 in Bombay City. The Upper Sind Frontier was entirely free from the disease and in the Thar and Parkar districts, one death only was registered. Among towns, Wai and Karad in the Satara district with rates of 58·33 and 49·58 respectively suffered severely. The chart attached to this report shows that the seasonal incidence of the disease followed its usual course which with its double rise is markedly different from the course usually followed in other provinces.

Plague in Coorg.

Only two deaths from plague were reported in Coorg during 1907; during the two preceding years this small province was entirely free from the disease.

Plague in Madras.

In 1906 there were 898 deaths recorded from plague, but in 1907 the number rose to 2,872. Out of a total of 23 districts, no case was reported from nine, in six others there were only a few imported cases and of the remaining eight, Bellary, the Nilgiris and Salem were the only ones in which the number of deaths was at all considerable. The months of greatest prevalence were September and October

and the disease was prevalent throughout the year in the Salem and South Canara districts. In towns the highest mortality was recorded in Bellary (787 deaths), Mangalore (121) and Tellichery (78).

Fevers. Table II of Appendix B to Section VI.

The total number of deaths recorded in British territory in India during 1907, under the heading "fevers" was 4,464,881 as compared with 4,452,842 during 1906, the ratios per thousand of the census population being 19·76 against 19·69 in 1906. The death rate returned under this heading in the year under review was higher than in any year since 1900 but it is probable that as plague was exceedingly prevalent an unusually large number of deaths from this disease were recorded under the heading "fevers." In last year's report some reasons were given for assuming that the number of deaths from malaria is about 25 per cent. of the number recorded as due to fever and on this estimate (which is doubtless too high) the number of deaths from malaria among the civil population in British territory during 1907 would have been 1,116,220 and the death rate 4·9 per thousand of population, figures which are not very different from those of plague. The largest numbers of deaths from fevers were, as usual, recorded in October, November and December and the smallest numbers in August, July and June. Amongst provinces with the highest mortality, the United Provinces stands first with 1,350,405 deaths, followed by Bengal with 1,171,540, Eastern Bengal and Assam with 631,197, and the Punjab with 405,481.

In both Lower and Upper Burma the recorded death rates under fevers were slightly higher than in the previous year, being 10·28 and 7·53 as compared with 9·77 and 7·34 respectively. The mean ratio in the preceding quinquennium was 7·02.

In Eastern Bengal and Assam 631,197 deaths from fever were recorded (21·17 per thousand of population) as compared with 645·733 deaths (21·65 per thousand) in 1906. The mean ratio for the antecedent quinquennium was 23·01. The Dinajpur district, as usual, returned the highest death rate, namely, 39·22, followed by Rajshahi with 35·66, Malda with 34·77, Jalpaiguri with 31·94 and Goalpara with 30·44. The largest number of deaths (82,376) was registered during December and the smallest in August. Among towns the highest death rates were recorded in Nawabganj (32·89 per thousand), Sherpur (35·33), Malda (30·45), Rampur Boalia (28·20), Nator (27·03), Cox's Bazaar (20·80) and Jalpaiguri (20·08). The total number of deaths recorded as due to Kala-Azar in the province was 2,227, as compared with 2,407 in 1906 and 3,030 in 1905. With the exception of Lakhimpur, deaths were reported from all districts, the largest number (845) having occurred in the Darrang district. The mortality from this cause has steadily declined since 1902, in which year there were 6,319 deaths. The first report to the Advisory Committee appointed to conduct an investigation regarding malaria and blackwater fever in the Dooars is referred to in Section IX.

In Bengal the death rate recorded from fevers during 1907 was 23·18 per thousand of population as compared with 22·41 in 1906 and 21·86 the average of the five years 1902—1906. The largest number of deaths occurred during October, November and December and the smallest during May and June. The highest death rates during the year were recorded in the districts of

Birbhum (38·27), Purnea (36·96), Palamau (33·19) and Nadia (32·38). Anti-malarial operations continued to be carried out in three towns—Ranaghat, Jagadispur and North Barrackpore at a total cost of Rs. 10,364.

The proposals of the Drainage Committee appointed in October 1906 to ascertain how far the prevalence of malarial fever in the Presidency Division is due to defective drainage were submitted to the Local Government in April 1907.

In the United Provinces 1,350,405 deaths (28·31 per thousand of population) were ascribed to fevers during 1907 as compared with 1,317,491 in 1906 (27·62 per thousand) and 26·12 the quinquennial average. The largest number of deaths was recorded in December and the smallest in August. The districts of Saharanpur, Bulandshahr and Jalaun recorded the highest mortality and Ballia, Garhwal, Partabgarh and Almora, as in 1906, the lowest. In towns the death rate was 26·60 against 28·44 in rural areas, the ratios for the previous year being 29·18 and 27·51 respectively. Among towns Deoband (Saharanpur), showed the highest death rate with 82·06, Sherpur (Bulandshahr) coming next with 72·25; and Bansdih and Sahatwar (both in the Ballia district) recorded the lowest rates (5·98 and 8·54 respectively).

In the Punjab during 1907 the total number of deaths recorded as due to fevers was 405,481 giving a ratio of 20·16 per thousand of population as compared with 407,878 and a ratio of 20·28 per thousand in 1906. The largest number of deaths was registered in December, due probably it is said to the combined effects of the great cold and the high prices which prevailed. The districts in which the highest death rates were registered were Delhi (33·96), Karnal (28·73), Gurgaon (26·17), Hissar (27·74), Rawalpindi (28·26), Attock (27·17), and Mianwali (27·52); the provincial Sanitary Commissioner considers, however, that in some of them, the mortality reported as due to fevers was swelled by that resulting from plague. In towns the highest mortality was recorded in Faridabad and Delhi in the Delhi district (46·33 and 45·37 respectively), Sirsa in the Hissar district (44·94) and Kot Mithan in the Dera Ghazi Khan district (42·44). The urban and rural death rates were practically the same, *viz*:—19·17 in the former and 20·28 in the latter.

In the North-West Frontier Province 52,361 deaths from fevers were recorded during 1907 as compared with 52,039 in 1906, the ratios per thousand of population being 27·44 and 26·14, respectively, the mean ratio for the preceding quinquennium being 22·83. The increase in the mortality was not due to malaria as the year under review was less malarious than its predecessor, but is attributed to the fact that large numbers of people whose constitutions had been sapped with malaria in the autumn of 1906, died of pulmonary complaints in the early part of the year and also in the month of December which was unusually cold. The months of greatest prevalence were January, February and December and the lowest July, August and April. The heaviest mortality was recorded in the Bannu district (31·75), followed by Dera Ismail Khan (31·31); and in towns Peshawar heads the list with 1,324 deaths (18·05), Dera Ismail Khan coming next with 611 (21·60).

In Ajmer-Merwara 11,117 deaths (23·31 per thousand of population) were ascribed to fevers as compared with 12,292 in 1906 (25·77 per thousand of population).

In the Central Provinces and Berar 213,908 deaths (18·00 per thousand of population) were ascribed to fevers during 1907 as compared with 225,141 (18·95 per thousand) in 1906. In 16 out of the 24 districts the mortality was lower, but in eight it was higher than in the previous year. The largest number of deaths (24,866) was reported in October and the smallest in April. The Provincial Sanitary Commissioner says there is reason to suspect that plague and many other diseases attended with febrile symptoms were registered as "fevers" and for this reason it is difficult to estimate the exact prevalence of malaria, the incidence of which, if judged by dispensary statistics, was lower than usual. In the towns of Betul, Damoh, Jubbulpore, Khandwa and Buldana and also in the three municipal towns of the Narsinghpur district, anti-malarial operations were carried out, and the drainage in the towns of Seoni and Akola was improved.

In the Bombay Presidency the number of deaths recorded as due to fevers was 260,329 (14·09 per thousand of population) as compared with 274,653 (14·86 per thousand) in 1906. The mean ratio for the preceding five years was 14·09. The districts with the highest mortality were Sukkur (26·51), Ahmedabad (25·92) and Larkhana (22·46); the lowest deathrates were registered in Bombay City (3·74), Belgaum (5·78) and Dharwar (7·18). The Sind Registration District again recorded the highest ratio (19·25 per thousand) and the Southern the lowest (8·33 per thousand). The largest number of deaths was reported in January and the smallest in June. Anti-malarial operations on a small scale were undertaken by the municipalities in the towns of Bijapur and Nasik.

In Coorg 4,868 deaths (26·95 per thousand of population) were recorded as due to fevers as compared with 4,266 in 1906 (23·62 per thousand of population).

In the Madras Presidency the deathrate recorded from fevers was, as usual, much lower than that recorded in any of the other chief provinces. The total number of deaths recorded under this heading was 284,430 against 304,926 in 1906, giving ratios of 7·8 and 8·4 per thousand, respectively. The districts of Ganjam and Vizagapatam, for the third time, returned the highest rates, *viz.*, 18·1 and 16·3 per thousand, respectively. In towns, excluding Madras, the highest rates recorded were in Nandyal (12·6), Nellore (12·5), Kurnool (11·8) and Anakapalle (11·1). The largest numbers of deaths were reported in December and January and the smallest in April and June.

Sale of quinine.

In Burma a large increase took place in the sale of quinine, a total of 1,265,564 powders having been disposed of in 1907, through the agency of post offices, district officers and vaccinators against 733,903 in 1906. It is hoped that arrangements for the issue of the drug as a compressed tablet will be possible during the current year, as in this form it is greatly preferred by the Burmans.

In Eastern Bengal and Assam the total number of packages of quinine sold was 18,993; no comparison can be made with the sales of previous years, as this is the first year for which there is a complete record of the sales throughout the province under the system of distributing the drug through the agency of district Civil Surgeons.

In Bengal 22,497 parcels of quinine (each containing 102 seven grain-packets) were sold against 32,189 in 1906 and 35,472 in 1905. The decrease is due to the fact that the figures for 1906 included the statistics of parcels sold in the 14 districts transferred to Eastern Bengal and Assam.

In the United Provinces only 722,377 powders were sold during 1907 against 1,205,181 in 1906—a decrease of 482,804 which it is said may be due to the free distribution of larger quantities of the drug. Post offices, landlords and schoolmasters sold fewer powders but vaccinators sold a larger number in 1907 than in the preceding year. Under the orders of the Local Government *tahsildars*, *patwaris*, stamp vendors and Court of Wards officials have been authorized to sell quinine and the system of sale through landlords was extended.

In the Punjab quinine was, as usual, distributed gratuitously through the agency of vaccinators, subordinate revenue and village officials, but beyond the statement that pice packets of quinine are kept for sale by postmasters at places where there is no dispensary no information regarding the sale of the drug is contained in the Provincial Sanitary Commissioner's report.

In the Central Provinces and Berar 3,361 packets, each containing 102 seven-grain powders, were sold during the year as compared with 4,362 in 1906. The decrease in the sales in 1907 is partly accounted for by the fact that the 3,285 packets supplied as an advance in 1906 for sale to the *patwaris* in the Nagpur, Wardha, Chanda and Balaghat districts have not been taken into account, as their actual sales are not known; and the decreased prevalence of malarial fevers may also account for the sale during the year. The drug was, as usual, sold by postmasters, schoolmasters, stamp vendors and *patwaris*.

Dysentery and diarrhœa. Table III of Appendix B to Section VI.

The number of deaths recorded in British territory in India under the heading dysentery and diarrhœa fell from 298,117 in 1906 to 282,191 in 1907, and the deathrate per thousand of population from 1·32 to 1·25. A higher mortality than in 1906 was recorded in Bengal, the Central Provinces and Berar and Coorg, but in all other Provinces the number of deaths reported was lower. In India as a whole the greatest number of deaths as in the two preceding years, occurred during August and September and the smallest number during February, March, April and May.

In Lower Burma in 1907 the recorded deathrate from dysentery and diarrhœa was 1·61 per thousand of population as compared with 1·65 in 1906 and in Upper Burma it was ·47 as compared with ·68. The urban and rural deathrates in Lower Burma were respectively 3·68 and 1·30 and in Upper Burma 1·63 and ·32. The low rates in rural areas are probably due to defective registration.

In Eastern Bengal and Assam 20,463 deaths were attributed to dysentery and diarrhœa in 1907 against 26,912 in the previous year, the deathrate per thousand of population being ·68 as compared with ·90. The highest mortality was, as usual, recorded in the tea districts of the Assam and Surma Valleys; Lakhimpur reported a ratio of 5·95, Darrang 4·10 and Sibsagar 4·08 per thousand of population. The highest mortality occurred in January and the lowest in August.

In Bengal, during 1907, 51,670 deaths (1·02 per thousand) from dysentery and diarrhœa were registered as compared with 48,920 (·96 per thousand) during 1906.

The increased mortality in the year under report is said to have been probably due to the severe prevalence of cholera. The districts in which the highest death-rates were recorded were Howrah (4·86), Puri (4·83), Cuttack (4·46), Calcutta (3·24) and Ranchi (3·00). In five towns no death from these causes was reported and in 35 others the number was less than ten in each. The deathrate in towns was, as in the year preceding, nearly three times as high as in rural areas.

In the United Provinces the recorded mortality from dysentery and diarrhœa (·47 per thousand of population) was lower than that in the previous year and also below the average (·61) of the preceding quinquennium. The greatest number of deaths from this cause was recorded in June and the smallest in February. The Garhwal and Almora districts again headed the list of districts with the highest deathrates and among towns Benares and Ballia, as in the previous year, recorded the highest mortality, *viz.*, 6·46 and 5·69 per thousand of population respectively. The urban deathrate was nearly six times as high as that in rural areas.

In the Punjab during 1907 the number of deaths recorded under this heading was 15,091 (·75 per thousand of population) as compared with 17,595 (·87 per thousand) in 1906. The districts which recorded the highest deathrates were Rawalpindi, Ambala, Jhang and Jhelum and those with the lowest were Muzaffargarh, Gujranwala, Attock and Dera Ghazi Khan. The mortality in towns was more than three times as high as in rural circles.

In the North-West Frontier Province 554 deaths were attributed to dysentery and diarrhœa as compared with 571 in 1906.

In Ajmer-Merwara 494 deaths were attributed to dysentery and diarrhœa as compared with 564 in 1906.

In the Central Provinces and Berâr the number of deaths from these diseases rose from 42,583 (3·58 per thousand of population) in 1906 to 46,820 (3·94 per thousand) of which Berar contributed 26,526 or 9·63 per thousand and the Central Provinces 20,294 or only 2·22 per thousand of population. In the former, the Akola and Buldana districts registered the high rates of 13·61 and 11·09 respectively. The greatest number of deaths took place in September and October and the smallest in February and April.

In the Bombay Presidency 53,708 deaths were recorded from dysentery and diarrhœa giving a ratio of 2·91 per thousand of population as compared with 61,736 (3·34 per thousand) in 1906. The deathrate was higher than in any other province except the Central Provinces and Berar. The mortality was highest in August and lowest in February. The highest ratios in Registration districts were recorded in the Western (4·64) and the lowest (·24) in Sind. The greatest prevalence of these diseases was in the rainy months July to October, inclusive, which the Deputy Sanitary Commissioner, Southern Registration District, states is possibly due to the washing by heavy rain of soil impurities into the wells or other sources of drinking water. Among individual districts the highest ratios were recorded in East Khandesh (10·13), West Khandesh (9·13) and Ahmednagar (6·56). In towns the deathrate was 3·29 and in rural areas it was 2·81 per thousand of population.

In Coorg 375 deaths (2·08 per thousand of population) were recorded from dysentery and diarrhœa as compared with 141 deaths (·78 per thousand of population) in the previous year.

In the Madras Presidency 60,326 deaths from dysentery and diarrhœa were recorded as compared with 61,588 in 1906, the death rate 1·7 being the same in both years. The highest district death rates were reported from Madras (6·14), the Nilgiris (5·5), Malabar (4·9) and South Canara (4·4) and the diseases were most prevalent in August, November and December.

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General History of Vaccination.

(For Statistical Tables, *see* page 161.)

Vaccination in India.

During the year 1907-08 vaccination operations were conducted among a total population of 236,563,889 persons. The total number of operations amounted to 9,169,873 which excludes 44,820 operations, particulars of which were received too late for incorporation in the Bengal vaccination report for the year. The total work of the department shows an increase on the results of the year 1906-07, when 9,080,303 operations were performed, but less than that of 1905-06 when the total was 9,277,896. The work done during 1907-08 shows an improvement, on that performed during the preceding year in every province, except Burma, the North-West Frontier Province, the Central Provinces and Coorg: in Burma (23,119) and the Central Provinces (18,134) the decrease was comparatively large, but in the North-West Frontier Province (1,038) and Coorg (82) it was not great. The primary cases numbered 8,351,530 as compared with 8,341,794 in 1906-07, but except for increases in Eastern Bengal and Assam, Ajmer-Merwara, Bombay and Madras, the other provinces showed a fall. On the other hand in re-vaccinations every province, except Burma, the North-West Frontier Province and the Central Provinces, showed an increase. In all there were 818,343 revaccinations compared with 738,509 during 1906-07. Particulars of the increase or decrease in the two classes of work in the several provinces will be found in the succeeding paragraphs. The quality of both the primary and revaccination work showed an improvement. In primary cases, on the aggregate, 97·65 per cent were successful against 97·21 in the previous year, the variation ranging between 99·32 per cent in Bengal and 91·86 per cent in Burma, the last named again occupying the last place. In revaccinations the percentage of success was 75·45 against 72·85 in 1906-07, the range being from 88·18 per cent. the highest, in the North-West Frontier Province and 58·97, the lowest, in Burma, the last named also occupying the lowest place in the previous year. Each vaccinator performed on the average 1,480 operations against 1,432 in 1906-07, there being the usual difference between provinces, the average per man being as high as 2,748 in the North-West Frontier Province and as low as 972 in Ajmer-Merwara.

The improvement in the vaccination work at dispensaries noticed last year was not maintained, as the total number of vaccination operations fell to 199,245 from 218,717 in 1906-07 and 207,421 in 1905-06. Four provinces show an increase, *viz.*, the United Provinces (1,181), Burma (610), Punjab (409) and Bombay (75), and the others a decrease, the more important being Bengal (15,002), Eastern Bengal and Assam (5,434) and the North-West Frontier Province (1,111).

The mean proportion of population successfully vaccinated, which had fallen from 36·39 in 1905-06 to 35·41 in 1906-07, rose again in 1907-08 to 36·07 per thousand of the census population. The highest ratio was, as usual, in Coorg, 53·74, and the lowest, 25·89, in Bombay. The protection afforded to children was at a higher rate than in the past few years. On an estimated birth-rate of 40 per thousand of the census population, the percentage of infants successfully vaccinated was 42·46 in 1904-05, 43·83 in 1905-06, 42·62 in 1906-07

and 44·36 in 1907-08. On this artificial calculation the Central Provinces returned the highest rate, *viz.*, 73·46, and Coorg the lowest, *viz.*, 10·44, these two provinces occupying the same places in the two preceding years.

The total cost of the department increased from £89,671 in 1906-07 to £92,672 in 1907-08, but the average cost of each successful case was the same in both years, *viz.*, $2\frac{1}{12}d.$ The expenditure was higher in every province, except Bombay, where it was lower than in the preceding year. In Bombay, however, the rate per successful case, $8\frac{1}{8}d.$, was highest while the lowest rate, $1\frac{1}{4}d.$, was in Eastern Bengal and Assam.

Vaccine Lymph.

As stated in the last report, all provinces, with the exception of the Central Provinces, the North-West Frontier Province and the two small provinces of Ajmer-Merwara and Coorg maintain their own depots for the manufacture of vaccine. The question of opening another depot at Ranchi, in Bengal, has been held in abeyance, while the fact that the depot at Patwa Dangar can now fully meet the requirements of the United Provinces, has resulted in a proposal to close the depot at Lucknow. The rebuilding of the Punjab Central Vaccine Institute at Lahore awaits the allotment of funds, and the buildings for the depot at Belgaum, for the Bombay Presidency, are in course of construction. In the Central Provinces the abolition of the Amraoti Paste depot necessitated the preparation of lymph at head quarter stations. The provision of suitable buildings for the purpose engaged attention. Further details as to the several descriptions of lymph used and the success secured in each province will be found in the succeeding paragraphs.

Burma.

The total vaccination operations in the province during 1907-08, numbered 406,533 or 23,119 fewer than in the previous year. Of the total 350,975 were primary cases and 55,558 revaccinations, showing decreases of 19,424 and 3,695, respectively. The quality of the work, however, showed an improvement as in the former class of work 91·86 per cent against 90·64 in 1906-07, and in the latter 58·97 per cent against 53·43, were successful. In the districts the work in Tharrawaddy declined to about half compared with the two preceding years, which the provincial Sanitary Commissioner attributes to inefficiency and want of tact on the part of the vaccinators. In Henzada the continuous decrease of over 20,000 cases, during 1905-06, 1906-07 and 1907-08, is reported to be due to the past records being unreliable and the results grossly exaggerated: moreover, the people are opposed to vaccination and give no assistance to the vaccinators. The falls in Akyab and Rangoon are due to the small number left to be vaccinated, so many having been vaccinated in preceding years to check epidemics of small-pox. At dispensaries the total operations numbered 19,131 against 18,521 in 1906-07. The primary cases were 10,443 against 10,690, and the revaccinations 8,688 against 7,831, and the percentage of success 95·32 against 90·12 in the former and 60·18 against 59·34 in the latter, in the two years 1907-08 and 1906-07, respectively.

As regards vaccination generally, the Burmese population maintains a passive attitude, while Karens accept it readily. In the Northern Shan States there is

active opposition and progress is likely to be slow. Inoculation is still freely practised in non-municipal areas, and in the absence of ready access to vaccinators and distrust in the efficacy of the operation, the rural population resort to inoculation when an epidemic of small-pox threatens. Legislation to prohibit inoculation in rural areas, which at present is illegal in municipalities only, is under contemplation, which combined with an improved organization to meet the demand for vaccination, will in time put a stop to the dangerous practice.

On an estimated birthrate of 40 per thousand of the population, 19·71 per cent of the children were successfully vaccinated, compared with 18·58 per cent in the previous year. In towns the number of children successfully vaccinated exceeded the number calculated to be available by deducting the deaths from the births of the year. This is due to children born outside the towns being brought in and vaccinated.

The vaccine supply for the whole province, except Rangoon, continued to be prepared at the Meiktila depot. The present strain of vaccine has been maintained for over two years and kept from deterioration by retro-vaccination and the occasional inoculation of rabbits; the latter procedure being more reliable is now adopted exclusively. The difficulty of obtaining pure lanoline in spite of every effort has resulted in the major portion of the lymph supply being glycerinated or quinated. From an analysis of results the quality of work by the use of glycerinated lymph (93·8 per cent successful) is superior to that of quinated lymph (91·0 per cent), but although the latter will not be issued to the same extent as heretofore, its supply is to be continued to outlying stations on account of its power of remaining unimpaired. With lanolinated lymph the percentage of success was 88·6. The result of experiments of sealing tubes of glycerinated and quinated vaccine with wax dissolved in chloroform conducted by Major Entrican, I.M.S., the Superintendent of the vaccine depot, showed that the method considerably reduces the number of extraneous organisms and does not appreciably affect the longevity of the vaccine: the experiments are to be continued on a large scale.

The vaccine supplied from the Rangoon municipal vaccine depot was better and, almost without exception, good during the year. Paste is obtained from Bangalore and calves vaccinated with it instead of starting a local strain of calf lymph.

To test the practical utility of portable haversacks for vaccinators an experimental issue is to be made.

The cost of the department rose from £8,592 in 1906-07 to £9,240 in 1907-08, and of each successful case 6$\frac{1}{16}$*d.* to 6$\frac{11}{16}$*d.* The increase is largely due to the travelling allowance drawn by the sixteen additional Native Superintendents of Vaccination entertained during the past three years, and also to the employment of additional vaccinators, and the adoption in districts of the increased pay sanctioned for district vaccinators.

Eastern Bengal and Assam.

The work of the vaccination department showed an improvement in 1907-08, when, with an increase of 40,612 operations compared with 1906-07, the total number amounted to 1,358,644 cases. Of this total 1,284,349 were primary cases

and 74,295 revaccinations, against 1,262,029 and 56,003, respectively, in the previous year. The percentage of success fell somewhat below the rate achieved in 1906-07, *i.e.*, 98·23 in primary cases against 98·55, and 70·21 in revaccinations against 72·11. Taking the province as a whole, there was an increase in the number of operations, which was most marked in the districts of Dacca (18,133), Tippera (16,133), Rangpur (17,150), Bakarganj (18,293), Pabna (6,955), Bogra (5,730), Kamrup (3,097) and the Khasi Hills (8,302). By a comparison, however, of the work in the Eastern Bengal districts with that in the Assam districts, it appears that since 1902-03 there has been an increase in the former, while in the latter the results have fluctuated from year to year, and during 1907-08 the amount of work done approximates that performed in 1903-04, which is below what was done in the intervening years. The absence of progress in the Assam districts is attributed to sickness due to kala azar, cholera and small-pox which tends to disturb the people, the population being sparse and communications difficult. Further, competent Assamese Inspectors of Vaccination are difficult to secure and Bengalis are loath to leave their own parts of the province. It is satisfactory to note that proposals to make service in the Assam districts more agreeable are under consideration. In the hill districts vaccination is making progress and it is a pleasing feature that the people of the Naga Hills and Chittagong Hill Tracts are acquiring the habit of applying for the services of a vaccinator when an outbreak of small-pox threatens.

The number of vaccinations at dispensaries amounted to 20,168, showing a further fall of 5,434 compared with the preceding year, and is accounted for by the fact of areas around the dispensaries in the Cachar and Sylhet districts, formerly reserved for dispensary officers, being placed under the Vaccination Department. The percentage of success in primary work was 98·40 against 97·89, and in revaccinations 81·34 against 86·08 in 1906-07. On tea gardens, of 15,347 operations, all, except 155, were primary cases with a percentage of success of 95·17. The corresponding figures in 1906-07 were 15,871, 71 and 98·28.

The department was revised with effect from the 1st April 1907 and now forms one graded provincial service which provides one inspector for each district and one sub-inspector for each circle in the plains and one sub-inspector for each district in the hills, with a reserve of four sub-inspectors for casualties. The standard of education for admission to the department has been raised, and as soon as arrangements can be made, all inspecting officers will receive a training in departmental work. Several civil surgeons have represented the advisability of replacing licensed by paid vaccinators as the inability to collect the fee of 2*d.* for each successful operation influences the number of candidates for licenses. It is mentioned that inoculation is still practised in the Habiganj subdivision of the Surma Valley district and in the Lakhimpur district.

On an estimated birthrate of 40 per thousand, 30·76 per cent of the infants were successfully vaccinated compared with 29·30 per cent in 1906-07. In towns 52·15 per cent of the available children were protected against 68·70 per cent in the previous year. Two vaccination Acts, India Act XIII of 1880 and Bengal Act V of 1880, the former in certain Assam towns and the latter in the Eastern Bengal and other Assam towns, are in force, but the working of the Bengal Act is not at present considered to be satisfactory, as both the inspecting staff and the vaccinators appear to fail in carrying out their duties efficiently.

The vaccine depot at Shillong worked satisfactorily during the year, loading 1,583,122 capillary tubes of vaccines, or 734,714 more than in the previous year, while the calves on the average yielded a larger supply of material. The quality and strength of the vaccine has been maintained and the complaints received as to the failure of supplies despatched from the depot in September and early October, are attributed to climatic influence in the plains. The machine for filling tubes invented by Major Entrican, I.M.S., was used with satisfactory results. Many improvements have been carried out at the depot and it is now possible to prepare twice as many tubes of vaccine as formerly and with less labour. Vaccine made with lanoline paste is no longer used and the province is now supplied with glycerinated vaccine stored in hermetically sealed capillary tubes. Instructions to discontinue vaccination from the arm and from locally vaccinated calves have been issued.

The department cost £6,806 against £6,042, the increase being due to the larger outturn of vaccine from the depot and also to the reorganization of the inspecting staff. Each successful case cost $1\frac{1}{4}d.$ which is $\frac{1}{12}d.$ more than in the previous year.

Bengal.

The total vaccination operations in the province numbered 2,058,371 in 1907-08, as compared with 2,037,273 in 1906-07. Of the total for the year, 1,868,290 or 6,686 fewer than the year before, were primary cases, and 190,081 or 27,784 more were revaccinations, giving a net increase of 21,098 cases. Of the thirty-four districts in the province, nineteen show an increase and fifteen a decrease; among the former the more noteworthy were Cuttack (18,874), Tributary States of Orissa (16,321), Puri (15,987), Jessore (11,405), and Manbhum (10,978); and among the latter the principal decreases occurred in Darjeeling (25,590), Murshidabad (16,513), and Bankura (10,416). Although on the whole the results were generally satisfactory, they would have been better but for the prevailing conditions of scarcity which made the people reluctant to offer their children for vaccination as they were unable to pay the prescribed fee. Indeed in some districts it was proposed to recoup the vaccinators for the loss sustained by unrealized fees. The better work in some districts stands to the credit of the department and the interest exhibited by district officers, while as to the smaller outturn in others, this was due to various local causes, among which in the majority of districts, scarcity played a part. The quality of the total work done was satisfactory and showed an improvement on the results of the previous year; in primary cases 99·32 per cent. were successful against 99·24 and in revaccinations 72·96 per cent. against 65·90. The paid vaccinators performed on the average a larger number of operations than the licensed men, but as in the preceding year, the latter secured a larger percentage of success in primary work, but not in revaccinations, than their paid confreres. There was a fall in the amount of work done by vaccinators attached to municipalities, dispensaries, etc., from 145,949 in 1906-07 to 130,947 cases in 1907-08. The primary cases were 88,481 against 90,873, and revaccinations 42,466 against 55,076 in the previous year. The percentage of success however showed an improvement, rising from 97·85 to 98·65 and from 56·66 to 68·70 in primary cases and revaccinations, respectively. In factories and on tea-gardens the primary cases and revaccinations numbered

4,279 and 11,421, respectively, as compared with 3,920 and 1,386, respectively, in 1906-07. The percentage of success was 95·02 against 98·44 and 78·92 against 42·92, respectively, in the two years.

On an estimated birth-rate of 40 per thousand of the population, 42·39 per cent. of the infants were protected compared with 39·46 in the previous year, which marks a continuance of the steady progress noted in the last report, and is due to the close and constant supervision exercised and the greater interest shown by civil surgeons and the vaccinating staff in the matter, and also to the inducement offered to vaccinators by the system of rewards, which are, as a rule, not granted unless a fair percentage of successful infant vaccination has been done. In municipal towns 83·40 per cent. of the available children were successfully vaccinated as compared with 87·29 per cent. in 1906-07.

Excluding 44,820 operations in the Patna and Sonepur States, for which particulars were not received, vaccination was conducted by the following methods—the figures in brackets are for the previous year—primary cases—calf lymph 93,049 (87,803), lanoline lymph 775,319 (696,415), arm-to-arm 979,753 (1,090,758), and the ratio of success was 99·01 (99·08), 98·59 (98·25) and 98·99 (99·13), respectively. In revaccinations the numbers of operations were—calf lymph 4,704 (5,718), lanoline lymph 107,697, (96,801), arm-to-arm 53,029 (59,778) with ratios of success of 74·70 (66·73), 64·77 (56·29) and 75·73 (77·75), respectively. At the animal vaccination depots at Calcutta and Darjeeling lanoline paste was manufactured, the average quantity being 278,340 and 67,801 grains, respectively. The outturn from the Calcutta depot has been increased to meet the demand owing to the abolition of arm-to-arm vaccination in the Presidency, Burdwan and Orissa Divisions. At the Darjeeling depot expansion is not possible, and it was proposed to open another depot at Ranchi to extend the vaccine supply to the Bihar and Chota Nagpur districts, and ultimately supplant the arm-to-arm process. The matter is in abeyance in view of the proposed introduction of a new and expeditious method of vaccine preparation. The vaccine supply at the Darjeeling depot failed during 1906-07 but was promptly re-established and measures have been taken to prevent a recurrence. Experiments conducted during the year by Captain Munro, I. M. S., with lanoline and glycerine vaccine, point to the superiority of the latter. As in past years the Darjeeling depot supplied vaccine to the Nepal Darbar and the Sikkim State: the quantities supplied during 1907-08 were 110 grains to the former and 770 grains to the latter, and the results were reported to have been satisfactory. The cost of the department was £13,578, but is not comparable with that in 1906-07, as the sum of £11,549 spent in that year excluded the Calcutta municipality and three Feudatory States for which no returns had been received. Each successful case cost $1\frac{3}{4}d.$ against $1\frac{5}{12}d.$ the year before.

United Provinces.

The fall of 20,356 vaccination operations in 1906-07 compared with 1905-06, was more than made good by an increase of 27,079 operations in 1907-08, when a total of 1,702,139 operations were performed. The primary cases, which numbered 1,562,231, were 9,255 fewer than in the previous year, but the revaccinations, which numbered 139,908, were 36,334 more, giving a net increase of 27,079. The percentage of success in primary work showed a slight improvement, 97·85

compared with 97·72 the year before, but in revaccination the percentage of success was 83·92 to which it fell from 84·43. Compared with the preceding year's work, twenty-nine districts out of forty-nine showed an increase in the number of successful primary vaccinations, the largest rise occurring in Gonda (7,326 cases) followed by Jalaun, Agra, Hardoi, Basti and Sultanpur, in all of which there was an increase of over 3,000 cases. Of the districts showing a decrease Sitapur heads the list with a fall of 36,038 cases, the explanation being that the previous year's figures had been falsified to a great extent. Azamgarh showed a fall of 4,717, ascribed to the mistrust and fear of anti-plague inoculations, followed by Shahjahanpur, Meerut, Gorakhpur, Partabgarh and Lucknow in all of which the decreases exceeded 1,000 cases. Various causes are assigned for the decreases, such as the transfer of vaccinators, the presence of plague and sickness among the people. A fairly satisfactory amount of work was done at dispensaries, the details of which are included in the total figures for the province. The total operations numbered 1,442 against 261 in 1906-07, and 655 in 1905-06. The work done at dispensaries is comparatively little, as children are mostly vaccinated at their homes or at appointed vaccination stations.

On an estimated birth-rate of 40 per thousand, 49·94 per cent. as compared with 48·49 per cent. in 1906-07, of the infants available were successfully vaccinated. In towns the number of children under one year of age available for vaccination were less than the number operated upon; this, it is explained, is due to the fact that children born outside municipalities were brought in to be vaccinated, and that probably the ages of children are often incorrectly estimated by vaccinators.

Bovine vaccine depots were maintained at Lucknow and Patwa Dangar (Naini Tal), but as the depot at the latter is now in a position to fully meet the requirements of the provinces for vaccine, it is proposed to close that at the former. The Lucknow depot cost £102 which shows an increase on the cost of the two preceding years. The Patwa Dangar depot, which was started in 1904 for the purpose of supplying pure fortified calf vaccine, has done excellent work since its inauguration. The quantity of glycerinated vaccine issued has increased from 21,049 tubes in 1904-05 to 198,224 tubes in 1907-08, and of lanoline paste from 79 grammes to 161 grammes: in addition glycerine paste has been issued in the last two years. The income of the depôt has increased steadily, from £7 in 1904-05, £137 in 1905-06, and £235 in 1906-07, to £408 in 1907-08. The expenditure however fell from £512 in 1905-06 to £448 in 1907-08. Besides supplies of vaccine being issued free to civil and military medical officers, supplies are made on payment to municipalities, the East Indian Railway, Native States and to private individuals and practitioners. The price charged for quantities of over 24 tubes, *viz.*, 4*s.* per 100 tubes of cow-calf vaccine and 3*s.* 4*d.* per 100 tubes of buffalo-calf vaccine, just covers the cost of production. It is estimated that the price of 1*d.* charged per tube for quantities of 24 tubes and under is one-sixth that charged in Great Britain. For filling tubes the machine invented by Major Entrican was used and the Sanitary Commissioner records that it has revolutionised the laborious task of tube filling.

Weir's metal combined scarifier and lancets, forged entirely of solid steel and nickel-plated, had been introduced during the preceding year and were issued to

many districts: they are considered to be a great improvement on the old form of scarifier. It is hoped shortly to make arrangements that will permit of arm-to-arm vaccination being entirely done away with in the province.

The cost of the department amounted to £10,835 against £10,065 in 1906-07, the increase being due chiefly to the purchase from England of bacteriological instruments and apparatus for the Patwa Dangar depot, and also to there being two full-time Deputy Sanitary Commissioners for about eight months of the year. The average cost of each successful case was $1\frac{7}{16}d.$ which is $\frac{1}{16}d.$ more than in the two preceding years.

Punjab.

There was an improvement in the work of the vaccination department during 1907-08 compared with the preceding year, when, with an increase of 2,464 cases, the total operations numbered 707,683. This, however, does not make up for the fall of 43,520 cases in 1906-07 compared with 1905-06. The total primary cases numbered 582,455 or 25,454 fewer than in 1906-07, but revaccinations were 125,228 or 27,918 more than in the previous year, leaving a net increase of 2,464 cases. The decrease in primary work is attributed to the fewer births, and affected most of the districts, being chiefly marked in the case of Kangra where the fall amounted to over 8,000 cases; large decreases also occurred in Lahore, Hissar, Ambala, Jullundur, and Gurdaspur, ranging between over 7,000 and over 3,000 cases. On the other hand increases of nearly 7,500 occurred in Amritsar, of over 5,000 in Ferozepur and of over 3,000 in Gurgaon and Multan. Revaccinations increased in all but thirteen districts, the more noticeable increases being in the Multan district (16,000), Kangra and Hoshiarpur (5,000 each) and Delhi (4,000). Of the districts showing a fall the chief were Gujranwala (4,000) and Shahpur (3,000). The percentage of success in both classes of work was however not as good as in the previous year, *viz.*, primary cases 99·03 against 99·34 and revaccinations 75·91 against 78·12.

On an estimated birth-rate of 40 per thousand of the population, 56·51 per cent. of the children were successfully vaccinated, compared with 60·05 per cent. in 1906-07 and 62·54 in 1905-06. As regards towns, 77 per cent. of the children available were successfully operated upon in towns where the Vaccination Act is in force, and 62 per cent. in the other towns: the corresponding rates in 1906-07 had been 71·44 and 68·04 per cent., respectively. The extension of the Vaccination Act to certain towns to which it does not apply has been recommended.

The Punjab vaccine depot issued a total of 12,258 grammes of chloroformed glycerinated vaccine during 1907-08, the quantities issued in 1906-07 and 1905-06 having been 7,995 and 4,970 grammes, respectively. The waste that occurs by demands in excess of requirements will, it is expected, be checked by the supply of vaccine on payment in future. The case and insertion success of the vaccine was below the rate in the previous year, *viz.*, primary cases—case success 96·99 per cent. against 99·88 per cent., insertion success 95·03 per cent. against 98·72 per cent. In revaccinations the corresponding rates were, 76·31 against 81·0 and 75·01 against 80·16, respectively. Plans and estimates for rebuilding the Punjab Vaccine Institute at Lahore have been prepared and construction only awaits the allotment of funds.

The cost of the department increased from £6,640 in 1906-07 to £6,941 in 1907-08, and is said to be due to the larger salary drawn by the

Deputy Sanitary Commissioner and to an increase under "contingencies" which is more than accounted for by the larger out-put of vaccine from the Vaccine Institute. Each successful case cost $2\frac{7}{12}$ *d.* or $\frac{1}{6}$*d.* more than in 1906-07.

In the large Native States, employing their own vaccinators, a total of 104,322 vaccinations were performed or 2,339 more than in the previous year, of which 80,743 were primary cases and 23,579 revaccinations. The former increased by 3,786 and the latter decreased by 1,447. The following are the results—the bracketted figures are those for 1906-07:—Patiala—primary cases 45,776 (45,174), revaccinations 22,455 (24,832); Bahawalpur—19,665 (15,277) and 322 (46); Kapurthala—3,796 (4,303) and 766 (97), Jhind—6,208 (7,116) all primary cases; Faridkot—3,720 (3,119) and 36 (40); Nabha—1,578 (1,968) and *nil* (11). The percentage of success ranged in primary cases from 99·21 to 90·19, and in revaccinations from 78·44 to 60·44.

North-West Frontier Province.

For the second year in succession the total number of vaccination operations, *viz.*, 90,855 in 1907-08 shows a decline, though the fall of 1,038 cases in that year was not as large as that of 8,973 in the previous year. The falling off was most marked in the Hazara district and is attributed to illness and transfers among vaccinators and to the water poisoning scare in April, May and June of 1907. On the other hand three districts show a satisfactory increase in the number of persons vaccinated. Of the total, 76,349 were primary cases against 76,604 in the previous year and the percentage of success 99·22 as compared with 98·95. The revaccinations numbered 14,506 against 15,289, and the percentage of success was 88·18 as compared with 83·67. Though the amount of work was less, the quality was better. At the Mardan dispensary 170 primary operations were performed and all are reported to have succeeded. No work was done in the Wano and Khyber Agencies where the year before 1,174 and 107 operations, respectively, had been performed. This was due to the people appearing to prefer their own method of small-pox inoculation.

As regards Political Agencies, the Sherani Country, the Kurram and Tochi Valleys, there was a total of 5,361 vaccination operations compared with 6,080 in the previous year, and while the percentage of success in primary cases rose from 98·90 in 1906-07 to 99·17 in 1907-08, that in revaccinations fell from 96·45 to 90·87. No work was done in the Chitral Sub-Agency owing to delay in the receipt of sanction for the employment of vaccinators. In the Swat Valley 70 operations were performed which are not included in the returns owing to delay in their receipt.

On an estimated birth-rate of 40 per thousand, 57·04 per cent. compared with 56·13 per cent. in the previous year, of the infant population were protected. In towns a larger number of children were vaccinated than were calculated to be available: this is due to children from outside being brought in and vaccinated.

Fresh animal lymph was used with a percentage of success of 95·78 in primary cases and 87·03 in revaccinations which are higher rates than obtained in the two preceding years. Glycerinated chloroform vaccine was used in more than double the number of cases for which fresh animal lymph was employed, and succeeded at the rates of 95·58 and 78·85 per cent. in primary

cases and revaccinations, respectively. The vaccine was supplied by the Punjab Vaccine Institute and its use in place of animal lymph is considered to possess many advantages, one of which is that vaccination is more popular as the use of children and buffalo-calves as vaccinifers is the less necessary. In the Shirani Country and Political Agencies, human lymph is still used and little difficulty is experienced in obtaining human vaccinifers, but when practicable, efforts are to be made to induce the freer use of fresh animal lymyh or glycerine vaccine.

The persuasion of three *Mullahs* of Hangu to learn to vaccinate referred to in the last report, was without any result and the matter has been dropped for the present.

The cost of the department increased from £748 in 1906-07 to £813 in 1907-08, and was generally due to unavoidable causes. Each successful case cost 2¼*d.* which is ⅛*d.* more than in the previous year.

Ajmer-Merwara.

124. The total number of vaccination operations, which had fallen from 14,935 in 1905-06 to 12,100 in 1906-07, rose to 14,575 in 1907-08. Of these 13,880 were primary cases compared with 11,973 the year before, and 14,510 in the year before that: revaccinations numbered 695 compared with 127 and 425, respectively, in the two preceding years. The percentage of success in primary cases was 97·94, or slightly higher than in the previous year when the rate was 97·87, and in revaccinations 67·19 which is much below the rates of 82·68 and 81·65, respectively, recorded in the two preceding years. No vaccinations were performed at dispensaries.

The cost of the department increased from £191 in 1906-07 to £202 in 1907-08, but the cost of each successful case fell from 3⅝*d.* to 3 5/16*d.*

Central Provinces.

The total work of the department, including dispensary vaccination and the operations in the Feudatory States, fell to 599,247 from 617,381 in the previous year, resulting in a decrease of 18,134 cases. The prevalence of plague in many parts of the province impeded the work and in addition the distribution of the different grades of vaccinators proportionately to districts, in consequence of the transfer of the control of vaccination establishments to local bodies, dislocated the working of the staff. Of the total operations 524,599 were primary cases against 525,977 the year before, and 74,648 revaccinations against 91,404. The fall in revaccinations which had been steadily increasing, is directly attributed to the effects of scarcity in almost every district. The percentage of success in primary work was practically the same in 1907-08 as in 1906-07, *viz.*, 98·41 against 98·56, but in revaccinations the rate rose to 76·36 from 75·38. The ratio of success in revaccinations is, however, considered to be doubtful and the high rate probably the result of returns being falsified by vaccinators.

Excluding dispensaries and Feudatory States, the number of primary operations in districts numbered 444,773 against 442,481 in 1906-07. This increase, it is claimed, would have been greater had it not been for the hinderances already mentioned, as primary vaccination is growing in popularity except in remote

tracts. The larger increases occurred in Nagpur (4,867), Jubbulpore (4,643), Drug (4,319) and Wardha (4,065), and the larger decreases in Mandla, (4,329), Chanda (2,855) and Buldana (2,531). The fall in districts is due to sickness among the people, etc., but in Mandla to vaccinators absenting themselves and falsifying their records. The revaccinations decreased from 81,051 in 1906-07 to 66,830 in 1907-08. All the districts except six show a fall; of these six, the largest increases occurred in Narsinghpur (1,602) and Nimar (706), while the largest decreases occurred in Bilaspur (3,152), Jubbulpore (3,000) and Hoshangabad (2,541). At dispensaries there were 20,964 primary cases and 3,060 revaccinations compared with 19,162 and 4,870, respectively, in the previous year, and the percentage of success in the two classes of work was 95·77 and 69·98, respectively, against ratio of 96·96 and 67·19 the year before.

In the Feudatory States the primary cases numbered 58,862 with 96·78 per cent. successful against 64,334 and 97·71 per cent. successful in 1906-07, and revaccinations 4,758 with 83·07 per cent. successful compared with 5,483 and 84·29, respectively, the figures of the previous year.

On an estimated birth-rate of 40 per thousand, 73·46 per cent. of the infants were protected compared with 73·61 in the previous year, while in the fifty towns in which the Vaccination Act is in force, 91·88 per cent. of the available children were successfully vaccinated against 81·93 per cent. in 1906-07 and 96·93 per cent. in 1905-06.

Glycerinated calf vaccine is now exclusively used except in the districts of Raipur and Drug where, in addition, vaccination direct from the calf, lanoline vaccine and the arm-to-arm process is practised, and in Yeotmal where fresh calf lymph is also employed. The ratio of success with glycerinated vaccine (93·0 per cent.) compares unfavourably with fresh calf lymph (95·19 per cent.) and the arm-to-arm process (97·33 per cent.), but is probably due to inexperience in preparation. Such results however cannot be avoided as owing to the abolition of the Amroati Paste depot, civil surgeons are obliged to prepare their supplies of vaccine in different parts of the districts in the absence of suitable buildings at head-quarters. This defect has been remedied in some districts and arrangements are being made to do so in the others.

The cost of the provincial department which had been £3,999 in 1906-07 rose to £4,195 in 1907-08, and is accounted for by compensation for dearness of food grains to the staff, transfers of vaccinators in consequence of the change in the conditions of service, and the erection of vaccine depots at some head-quarter towns. The cost of each successful case, however, was 2*d.* as in the year before. In the Feudatory States the cost of the department was £334 against £352, and of each successful case 1¼*d.* in both 1907-08 and 1906-07.

Bombay.

In the two years 1905-06 and 1906-07 the total number of vaccination operations showed a decrease in each compared with the year preceding: in the first a fall of 12,669 cases and in the second of 26,286 cases. During 1907-08, however, the total number of cases, excluding 811 secondary operations, amounted to 636,837 showing an increase of 7,653 compared with the preceding year. Very little of the lost ground has so far been made good. Of the total operations performed 596,663 (including 780 secondary cases) were

primary cases or 3,312 more than in the previous year with a percentage of success of 96·78 against 95·93. Revaccinations (including 31 secondary cases) numbered 40,985 which was 3,475 in excess of the number in 1906-07 and these succeeded at the rate of 75·86 per cent. against 71·04 per cent. In the above figures is included the work done at dispensaries, where the primary cases numbered 730 as compared with 325 in 1906-07, and revaccinations 850 compared with 1,180. The percentage of success in the former was 96·71 against 84·16 and in the latter 19·10 against 54·22. With the exception of the revaccination work at dispensaries, both the quantity and quality of the work done during the year was better than during the previous year.

On an estimated birth rate of 40 per thousand of the population, 50·20 per cent. of the children born during the year were successfully vaccinated compared with a rate of 49·71 during 1906-07. In regard to towns, as in the previous year, the number of children vaccinated exceeded the number available which is due to children being brought in from outside to be operated upon.

No English lymph was obtained, and the glycerinated vaccine which has been brought into general use throughout British territory (excepting Sind) gave fairly good results. In the Western and Gujarat registration districts no animal lymph was used, and in the others calf to arm vaccination was in force on a small scale. The buildings for the vaccine depot at Belgaum, estimated to cost £9,540, are in course of construction. No inoculation was reported to have been practised in the Presidency, and opposition to vaccination was reported from the Gujarat and Sind registration districts only.

The cost of the department which had risen from £20,087 in 1905-06 to £21,742 in 1906-07, fell to £19,596 in 1907-08. This decrease is due to a fall under the head "provincial" under which the expenditure was smaller owing to the difference in the pay drawn by the Deputy Sanitary Commissioners, and to the expenses of the vaccine obtained from the Belgaum vaccine depot being excluded: these expenses are now met by contributions from Local Funds. The average cost of each successful case which had been 9½*d.* in the preceding year, fell to 8½*d.*

Coorg.

The total operations numbered 10,904, or 20 more than during 1906-07, of which 8,452, against 9,013, were primary cases and 2,452, against 1,871, were revaccinations. The percentage of success in the two classes of work was 93·47 and 78·79, respectively, as compared with 93·22 and 75·54 in the previous year. At dispensaries 246 operations were performed against 348 in 1906-07, the percentage of success in primary cases rising from 87·85 to 97·65 and in revaccinations from 72·22 to 85·82. The cost of the department was £485 or £1 more than in the previous year, and of each successful case 4⅞*d.* which is 1/12*d.* in excess of the cost in 1906-07.

Madras.

The increase of 86,610 cases in 1906-07 was further added to in 1907-08, when with an increase of 76,248 cases, the total vaccination operations in the Presidency numbered 1,627,848. This increase is generally attributed to the prevalence of small-pox and the direction to Deputy Inspectors of the affected areas to vaccinate unprotected persons. Of the total, 1,503,368 were primary cases which

show an increase of 65,444 on the number in the preceding year, and 124,480 revaccinations which show an increase of 10,804. The percentage of success in primary work was 95·61 compared with 93·41 in the preceding year, and in revaccinations the rate was 76·60 compared with 74·24. Large increases were shown in Vizagapatam (30,558), North Arcot (14,739), South Arcot (14,509), Madura (10,334), and smaller increases in others, while on the other hand certain districts show a decrease, the largest of these being Kistna (11,907), Godavari (4,365), Coimbatore (3,339), South Canara (2,266) and Anantapur (2,025). The causes of the decreases are said to have been the redistribution of ranges in two districts, the absence of vaccinators without substitutes in two others and the prevalence of cholera in another. In municipalities there was again a reduction in the number of operations performed, from 153,269 cases in 1906-07 to 150,906 cases in 1907-08, the largest fall occurring in Cocanada (3,773), followed by Calicut (1,493), Trichinopoly (1,257) and three others with decreases of less than 1,000 cases. The smaller amount of work is attributed to the prevalence of either plague or cholera and the absence of small-pox. The largest increase in municipalities was shown by Madura (2,424), the next highest being Vizianagram (609). The vaccination work at dispensaries showed a further fall from 248 to 158 cases, which were performed at three dispensaries. The reason for this is the local Government's orders of April 1905 removing the responsibility of vaccination from medical officers.

On an estimated birth rate of 40 per thousand, 36·98 per cent. of the infants were successfully vaccinated, against 31·92 per cent. in the previous year, and in municipalities 67·3 per cent., as compared with 65·7 per cent. in the previous year.

As was the case in the preceding year, by far the greatest number of vaccination operations were performed with lanoline vaccine, the percentage of success rising in Local Fund areas from 94·0 to 95·4 and in municipalities from 95·9 to 97·0. In calf to arm vaccination the percentage of success was 99·7 and with locally prepared glycerinated vaccine it was 99·5.

The cost of the department rose from £19,659 in 1906-07 to £19,947 in 1907-08 and the average cost of each successful case was 3¼*d.* which is ¼*d.* less than in the preceding year.

Sanitary Works.

Burma.

130. The income of municipalities in Burma is not given in the provincial sanitary report, but it is stated that the average expenditure on sanitary works was 44·57 per cent. of income, made up as follows:—4·98 per cent. on water supply, 1·33 per cent. on drainage, 20·84 per cent. on conservancy and 17·42 per cent. on other sanitary works. From Town Funds 42·56 per cent. of income was devoted to sanitary purposes and 0·60 per cent. to water supply. As remarked by the provincial Sanitary Commissioner, the small expenditure on water supply, having regard to the annual recurrence of water-borne diseases, affords ground for misgiving.

In Rangoon the scheme for the distribution of pipe water throughout the "pucca" area has continued to progress: the improvement and extension of the "Shone and Ault" system of sewerage has also been continued. In Akyab the amended estimate for the gravitation water supply scheme amounting to £20,239 has been sanctioned and work is in progress. At Mandalay the water supply scheme has reached a stage at which choice lies between two projects, either the Sedaw Reservoir scheme to cost £1,54,439 or the Irrawaddy Intake scheme to cost £1,23,472; the matter however is now before the local Government. The Henzada conservancy scheme was sanctioned by Government and introduced during the year, while the improved conservancy scheme for Mandalay was temporarily suspended owing to the lack of funds.

Sanction has been accorded by the local Government to an expenditure of £400 for the erection of model sanitary works, close to the market at Insein, which will serve as object lessons to medical and municipal officers throughout the province. The Sanitary Commissioner considers this valuable project is capable of extension.

Sanitary Board.

The Sanitary Board held two meetings during the year, at the first of which it approved the Henzada conservancy scheme already referred to, which is to cost £3,724, and at the second it considered the scheme for the Mandalay water supply: two of the four schemes considered by the Board have been placed before the local Government.

Eastern Bengal and Assam.

The income of the forty-four municipalities, two stations and four unions during the year 1906-07 amounted, including the opening balance, to £1,11,774. The expenditure on sanitation amounted to 41·98 per cent. of income, compared with 42·12 per cent. in the preceding year, which included—the figures in brackets are for the year 1905-06,—water supply £5,656 (£5,143); drainage £2,646 (£3,041); conservancy £26,733 (£24,211), markets and slaughter houses £1,055 (£1,562); construction of roads £16,729 (£14,294). The expenditure on water supply, conservancy and roads

was greater than in the previous year, while under the general head "other sanitary works" the expenditure of £528 in 1905-06 increased to £1,892 in 1906-07. Seven municipalities and two unions spent over 50 per cent. of their income on sanitation, and fifteen municipalities, two stations and one union spent between 40 and 50 per cent. Many of the municipalities have specific sanitary schemes either in progress or contemplated. Progress is however slow, the chief difficulty being the lack of funds. The appointment of a Sanitary Engineer has been sanctioned and this officer will be of great assistance in the preparation and supervision of sanitary projects.

At Dacca the schemes for the extension of the water supply and improvement of the surface drainage, still remain under consideration, but many minor improvements in the conservancy arrangements and to the drainage and roads are being carried out. The tramway line depots and trenching grounds of the new conservancy scheme were in progress and will, it is expected, soon be ready for use. At Narayanganj the water supply scheme has been practically completed and a surface drainage scheme, to be completed in three successive years, has been prepared. At Chittagong tests for an artesian water supply were undertaken which must be continued before the suitability of the scheme can be decided. At Dinajpur the scheme to canalise the Ghagra and Kachai streams is still under consideration, but will probably be taken in hand shortly. The Commissioners of English Bazar have drawn up a scheme of surface drainage for the main portion of the Bazar which is under the consideration of the local Government. At Rampur Boalia the difficulty of arriving at a satisfactory scheme for supplying drinking water to the town has not yet been overcome.

Sanitary Board.

The newly appointed Sanitary Engineer joined the Board as a member. Only one regular meeting of the Board was held during the year, but a good deal of work was done by correspondence in connection with water supply and drainage schemes in municipalities and the improvement of water supplies in rural areas. As regards the last mentioned, £2,032, representing the one-third share of the cost granted by Government, was distributed to District and Local Boards during the year 1907-08, which shows an increase of £860 on the amount of the grant in the preceding year. Notwithstanding these grants the progress is said to be slow, and there is a feeling that the conditions under which they are given are not convenient for practical working.

The Board has under consideration a report by the Deputy Sanitary Commissioner on an examination of the unhealthy tracts of the Faridpur, Rangpur and Rajshahi districts, and also on an inquiry into the water supply of Kamrup which has a high cholera mortality as a constant feature. It is anticipated that special grants will be necessary to improve the present sanitary conditions in those areas.

Bengal.

The number of *mofussil* municipalities in Bengal during the year 1906-07 was the same as in the preceding year, *viz.*, 128. Their income, excluding the opening balance of £61972, amounted to £350,812 against an income of £331,142 in 1905-06. Of the total sum available—the figures in brackets represent the expenditure during the preceding year—43·15 (38·63) per cent. was

spent on sanitary works (original and recurring), 7·24 (8·76) per cent. on roads, 5·04 (5·19) per cent. on public safety, and 27·59 (30·96) per cent. on all other requirements. On water supply £23,036 was spent, showing an increase of £6,499 on the expenditure during the previous year; on drainage £23,109 or £12,438 more; on conservancy £83,018 or £4,418 more, while the smaller sums spent on markets and slaughter houses and vaccination show decreases of £2,132 and £7 respectively. There were satisfactory increases under the important heads and the large increase under drainage is accounted for by the construction of drains in the Howrah municipality. The decrease under markets and slaughter houses is explained by the heavy expenditure under this head in Howrah, Chapra and Puri in the previous year.

The steady rise in the expenditure on conservancy shows that due attention is being paid to this important matter, but it is urged that no material benefit is likely to accrue unless a suitable staff is employed to keep the system in good order. Night soil is now properly trenched, and as a rule trenching grounds are cultivated, in many cases at a profit. The examination of several samples of septic tank effluents showed that they were often of inferior quality and the Deputy Sanitary Commissioner, Bengal and Orissa Circle, was deputed to inspect some of the installations and suggest remedial measures. As neither the Sanitary Commissioner nor the Deputy Sanitary Commissioner can, under present arrangements, regularly inspect the septic tank latrines in the various mills, the appointment of an inspecting officer for this work has been recommended and is under the consideration of the local Government. The Patna system of improving village sanitation was tried in six districts only: in Patna 5,333 villages were cleansed on a systematic plan, 51 in Midnapore and 37 in Monghyr and smaller numbers in the others.

Almost all important towns are now busy in preparing comprehensive drainage schemes, but two municipalities, Suri and Bihar, are unable to proceed for want of funds. As to water supplies, apart from water works, several municipalities have effected improvements by excavating new wells and tanks or by re-excavating or repairing existing ones.

Sanitary Board.

The Board held two meetings during the year, at which the principal subjects of discussion were the Puri and Chapra drainage schemes, and the supervision of the preparation of the municipal drainage schemes in the Presidency Division; a good deal of consultation work was also carried on by the circulation of papers.

The two following were the more important of the preliminary estimates prepared during the year.

Burdwan water works.—Scarcity of water was threatened as the Banka which supplies the town was being insufficiently fed from the Damoodar. The Sanitary Engineer inspected the locality and found a site whence water could be pumped direct from the Damoodar.

Water supply to the Akra Brick Factory.—On the invitation of the Superintending Engineer, Central Circle, the Sanitary Engineer formulated a

scheme for the excavation of a tank to be filled from the river by pumping the water to be discharged into the tank at one end, and from the other the clear water lifted into a masonry sand filter. The filtered water is to be drawn from taps fixed to the wall of the clear water reservoir.

Detailed estimates were prepared for the following :—

Puri water works.—The rough project to cost £16,033 prepared by the Sanitary Engineer in 1904, was held over as the Municipal Commissioners undertook to carry out the drainage scheme first. The water works scheme was considered and approved by the Commissioners in March 1907 and the Sanitary Engineer was directed by Government to proceed with the preparation of details.

Bhagalpur water works remodelling.—Detailed plans and estimates amounting to £755 for a fifth filter were sent to the Chairman of the municipality.

Gaya water works.—A rough project had been prepared during the previous year, estimated to cost £42,000. Although orders were received from the local Government to proceed with the preparation of details, these could not be completed during the year as particulars of borings at the site of the pumping station were delayed.

Drainage schemes.—The preparation of drainage schemes for Burdwan, Bankura, Arrah and Bettiah were completed, and good progress made in those for the municipalities of Monghyr, Kalna, Murshidabad, Jessore, Garden Reach and Bhatpara. The preparation of the scheme for Kissengunge was entrusted to the Executive Engineer, Bhagalpur Division.

On the recommendation of the Board, Government has sanctioned the appointment of four surveyors temporarily for five years from February 1907, and two more from October 1907, to draw up schemes of surface drainage for municipalities.

Among others, the following schemes were considered :—

Hooghly-Chinsurah drainage scheme, Shahagunge-Bally section.—Estimated to cost £11,431. The scheme was approved and submitted to Government for sanction.

Nawi and Sunthi rivers drainage project.—The scheme is for opening out the rivers in the Barasat sub-division of the 24-Parganas district, the tract of country to be benefited covering 70 square miles. The estimate prepared by the Public Works Department amounts to £31,143 or, including cost of maintenance, £39,476. The Board considered that there is reasonable expectation that there will be an improvement in the health of the people, if the scheme results in carrying off all the water it is designed to carry. The scheme has been taken up under the Bengal Drainage Act.

Puri drainage scheme.—This scheme estimated to cost £15,322 was sanctioned by Government who made a grant-in-aid of £5,000 towards the work which was taken in hand at the close of the year.

Howrah drainage scheme—South Foreshore Section.—The scheme costing about £7,856, received the sanction of Government and considerable progress was made in the construction of the drains in Blocks IV and VII.

Monghyr water works.—The scheme to cost £23,114, excluding the charge for unfiltered water pumping arrangements, was approved by the Board and submitted to Government for sanction.

Howrah water works.—This scheme for improving and extending the distribution system was examined by the Board and sanctioned by Government.

United Provinces.

Good progress in municipal sanitation continues in the province, which is evidenced by the fact that during the year the Sanitary Board dealt with projects and estimates amounting to £2,92,688 for improving the sanitary condition of various municipalities. This represents the highest amount yet dealt with in any year. Of the total income an average of 50 per cent. was spent on conservancy, plague, water supply, and drainage (including the capital outlay). The sum spent on water supply alone was £64,741 compared with £43,485 in the preceding year, which was incurred chiefly by the eight large towns. Those towns however spent less on drainage, reducing the total expenditure on this head to £57,199, from the sum of £73,147 the year before. The resources of municipalities have been much augmented by the relief from all police charges and all direct expenditure on plague. Loans are liberally granted and special grants are made when they are most needed, so that funds are now available for expenditure on sanitation.

The water supply works at Agra, Allahabad, Benares, Cawnpore, Lucknow, Meerut, Mussoorie and Naini Tal all worked satisfactorily throughout the year: extensions were carried out and the number of house connections rose. At the instance of the Sanitary Engineer, the necessity for adding to the pumping plant at Cawnpore, in order to provide a reserve, is under consideration. The consumption of water is increasing, and while in some cases it is due to the growth of population and legitimate expansion, in others it is considered to be due to greater wasteful expenditure.

At Agra owing, it is said, to the want of funds, only 1,362 feet of drains were made during the year. At Allahabad 26,700 square feet of lanes were paved with stones and 6,614 feet of drains were laid. At Benares 3,669 feet of drains left unfinished in the previous year were completed, and about 2,590 L. feet of small stoneware pipe branch sewers were laid. The Mussoorie hydro-electric scheme for extending the water works and electric lighting to the station was under construction, a sum of over £30,000 being spent during the year.

The drainage works in Deoband and Nagina were completed and those at Hathras were in progress. Projects for the drainage of Saharanpur, Muttra, Jaunpur, Budaun, Ujhani, Moradabad and Khurja were completed, but most of them are being revised or recast. Drainage schemes for five other places have been completed but not yet submitted, and surveys are being made in connection with the preparation of projects for seven other places.

Sanitary Board.

137. The Board held seven meetings during the year at which, as already stated, the members considered, criticised and approved projects and estimates amounting to the largest sum yet dealt with in any one year. The Board noticed with regret the large falling off in the expenditure on village sanitation, which in the year preceding had increased to the highest on record.

The question of the construction of an intercepting sewer in connection with the Lucknow drainage scheme was considered and it was decided to defer the matter for the present. In the meantime, at the instance of the Board, a sum of £1,333 was sanctioned by Government for the purchase of plant for the continuance of the Sanitary Engineer's purification experiments, which latterly have been encouraging. The Board resolved that no standard scale of cost for drainage projects in towns was possible, as the general and physical condition of towns varied greatly in almost all respects, which precludes the adoption of a common basis of estimation.

Punjab.

No information is contained in the provincial Sanitary report as to the income of the municipal towns of the province and the expenditure on sanitation therein. The annual review of the municipal reports and returns for 1906-07, however, shows that of a total income of £391,435, excluding the opening balance, against £3,60,274 in the previous year, the sum of £188,372 was spent on public health and convenience, or £3,563 less than during 1905-06. Of the sum of £188,333, the largest expenditure was on conservancy (£42,815); hospitals and dispensaries (£34,149); drainage (£28,691); and water supply (£30,973). At Lahore an estimate of £5,200 was sanctioned for the construction of twelve new wells in extension of the existing system of trench wells at the head-works of the city water supply and the work is in hand. A project for improving the storm drainage outfall from the civil lines at an estimated cost of £1,314 has been sanctioned, and execution awaits the provision of funds by the Municipal Committee. The city conservancy tramway was completed and brought into use during the year. The Ludhiana water works scheme estimated to cost £28,698 made excellent progress under the direct superintendence of the Sanitary Engineer. At Amritsar sanction has been applied for to an estimate of £5,333 for disposal works at the termination of the city outfall drain. The intramural drainage works were in hand but progress was retarded owing to a temporary breakdown of the arrangements for brick making. At Delhi the necessity for an estimated expenditure of £12,867 for the further extension of the head-works of the water supply was represented to the Committee. The intramural drainage works made good progress and are approaching completion. At Gujrat the extramural drainage works and disposal works were completed, and an estimate amounting to £1,867 has been prepared for the intramural drainage of the city. Similarly in Rawalpindi the extramural drainage works were completed at a cost of £9,264, and an estimate for intramural drainage was in hand.

The Sanitary Engineer regrets being unable to report any improvement in the matter of the maintenance of completed drainage works, and notes that with few exceptions, the outfall drains and disposal works inspected were not well maintained. It is mentioned that the open system of drainage has been adopted generally in the Punjab and is suitable for the conditions that obtain. Regular and systematic flushing and cleaning are however essential to successful working, and unless municipal bodies make some special effort to reorganize the scavenging and flushing establishments, the drainage schemes will be of doubtful benefit. With regard to sanitation generally, the Sanitary Engineer is of the opinion that further substantial progress cannot be expected till it is recognized that the smaller municipalities cannot afford to construct water supply and drainage

works for themselves, and that if such are to be constructed, a liberal sum from provincial revenues must be set aside for the purpose.

The income from sullage disposal was generally satisfactory; decreases occurred in a few places and were due to local circumstances. The income from the sale of manure fell somewhat short of that realized in the previous year, *viz.*, £10,598 against £10,656.

Of the rewards offered by District Boards for sanitary improvements in villages, none were earned owing to lack of interest in sanitary matters.

Sanitary Board.

The Board held four meetings during the year. Out of the grant of £2,000 sanctioned for grants-in-aid to municipalities, a sum of £720 was allotted to Gurdaspur, Sialkot City, Karnal, Ambala, and Ladwa. The balance of £1,280 was withdrawn owing to the unfavourable agricultural conditions prevailing in the province. Out of the grant of £167 for experiments in connection with sanitation, £67 was withdrawn, and of the balance £27 only was spent on testing the strength of stoneware pipes and their joints under water pressure and on the purchase of a pump for trial.

The Board approved of the manner in which the sum of £1,733 sanctioned for sanitary improvements in villages in the Chenab Canal colonies, had been utilized.

North-West Frontier Province.

No sanitary work of importance was undertaken during the year in this province. In the Hazara district the construction and repair of drains, the paving of streets, etc., was carried out: in Dera Ismail Khan the municipality spent over £200 in improving drainage and sewerage, and in Peshawar the municipality spent over £1,667 in improving the water supply, cleaning and repairing wells, etc. It is noteworthy that the Abbottabad municipality, to improve their sanitation generally, spent £1,214 on sanitary charges out of a total income of £2,102.

The income from the sale of manure in Peshawar showed a great falling off from what was derived from this source two years ago, and in Dera Ismail Khan the Administrative Medical Officer considers the income under this head might be considerably increased.

Central Provinces.

The income of district head-quarters municipalities during 1906-07, excluding the opening balance and receipts under special heads, amounted to £90,040 showing an increase of £3,596 on the income of the preceding year. Of the total, 42·72 per cent. was expended on sanitary works (original and recurring) such as water supply, drainage, conservancy, etc., 5·21 per cent. on medical relief, 4·54 per cent. on plague and 0·17 on vaccination, which shews an increase under all heads, except vaccination, on which the expenditure was the same in both years.

In Jubbulpore an important project in connection with the improvement and extension of the water supply at an estimated cost of £21,551 was taken in hand and good progress made during the year. The drainage scheme for the Yeotmal municipality is said to be still under consideration. In most of the districts minor works connected with water supply, drainage, etc., were carried out by municipalities.

Sanitary Board.

The Board met at the head-quarters of all districts except Betul, Chhindwara, Drug and Buldana. The work done under its direction consisted, as usual, of the construction of new wells, the improvement of existing ones, the repair of roads, drainage, clearing of village sites, etc.

The reconstitution of the Board on more practical lines is now under the consideration of the Chief Commissioner.

The recommendation to appoint a Sanitary Engineer for the province could not be carried into effect as no officer was available. It was however suggested that pending the services of a suitable officer being available, it might be possible to have projects for drainage and other sanitary works required in the province, drawn up by an expert and criticised and passed by an experienced Sanitary Engineer.

Bombay.

The income of the 161 municipalities in the *mofussil* during the year ending 31st March 1907, amounted to £4,75,498, of which £1,29,861 or 27·3 per cent. was spent on improving water supply, drainage and conservancy within municipal limits. There were 25 District Local Boards and 211 Taluka Local Boards, the joint income of which amounted during the year to £4,23,901 and of this sum £20,519 or 4·8 per cent. was spent on water supply and drainage. Compared with the preceding year income has increased in both cases, but the expenditure on sanitary works has been lower.

Sanitary Board.

The Board held two meetings and among other matters considered proposals for the improvement of the water supply of Pandharpur, and the question of the establishment required for the preparation of projects or estimates for sanitary works for municipalities.

During the year considerable progress was made in the extension of the Shone system of drainage at Karachi. The Pandharpur drainage scheme to cost £13,377, was sanctioned and work put in hand by municipal agency.

Several projects for sanitary works have received attention during the year, among them being the Dharwar water supply scheme, estimated to cost £21,300; Hubli water supply improvements £6,533 and extensions and improvements, including provision for filtering the water, £21,333; improvement of the Ahmednagar water supply, £20,000 in the first stage, and £43,333 when completed; improvement of the Hyderabad (Sind) water supply, £26,667 on the whole or £16,667 for urgent works only; and improvement of the Pandharpur water supply, £34,510. The last mentioned is a specially important work on account of the large numbers of pilgrims visiting the town and making the question of a good water supply there a matter of provincial importance.

In connection with the execution of sanitary works the local Government has announced the grant of liberal aid to municipalities and local boards.

Madras.

No reference is made in the provincial report of the income of municipalities or of the expenditure by them on sanitation, but from the General Municipal Review of the Presidency during 1906-07, it appears that, excluding the opening balance of £76,920 the total income of district municipalities was

£260,310, against £255,665 in the previous year. The expenditure on drainage was £4,476 against £4,015 and excludes the expenditure of £10,551 on the Ootacamund drainage scheme which was charged to provincial funds. Under water supply the expenditure was £7,333 spent on new works and £12,273 on establishment, maintenance and repairs, against £9,502 and £11,146 respectively, the year before. On conservancy, roads and plague £62,527 was spent against £59,453 in 1905-06. Of District Boards it is stated that a sum of £55,025 was allotted for sanitation charges. Of this amount 39·7 per cent. was set apart for conservancy and 19·4 per cent. for the improvement of water supply. The total expenditure on sanitation amounted to 50·5 per cent. of the allotment. The result as the provincial Sanitary Commissioner expresses it "savours of considerable apathy" on the part of the Boards, some of which failed to spend even 50 per cent. of the assignment for sanitary works. In regard to municipalities which evidence a desire to accept advice and carry out reforms, the paucity of funds is a drawback, a result of which is that petty works only are possible except where Government has subsidized municipal funds with grants for water supply and drainage schemes.

During 1907 the following schemes were to be investigated, *viz.*, drainage of Mangalore and Negapatam, water supply of Anantapur, Vaniyambadi, Rajahmundry, Mangalore and Palamcottah, and extension of the water supply of Gudiyattam. Of the 1906 programme, schemes for the drainage of Srirangam and Trichinopoly and the water supply of Masulipatam were reported on, while the Bezwada water supply scheme was revised and submitted.

During the year the water works of Vellore, costing Rs. £25,168, Nellore costing £11,813, and Gudiyattam costing £3,933, were completed. The Saidapet water works scheme was held in abeyance pending orders as to the exclusion of the site of the head-works from cantonment limits. The improvement of the Guntur water works was completed, and improvements to the Cocanada and Cuddapah water works were in hand. The Ootacamund drainage works were adversely affected by almost continuous rain from April to August 1907, but during the last five months of the year the time lost was more than made up and it is expected that the principal parts of the works will have been completed by June 1908. The scheme so far has answered expectations and the improvement in the sanitation of the bazar is said to be very evident.

Sewage farming has not been attended with the expected financial success, due more to defective methods and bad management than to absence of manurial value in sewage. The cultivation of land trenched with night soil made little or no progress, which is attributed in most municipalities to their neglect to take advantage of a means of increasing their income.

Sanitary Board.

The Board is not vested with any powers of control, but examines sanitary schemes submitted for approval and advises as to their suitability and sufficiency from a sanitary point of view. Much of the work consists of the examination of water supply and drainage schemes for towns. The estimated cost of the schemes dealt with by the Board in 1907 was £54,894. Of these twenty-five works, estimated to cost £46,202 were for municipalities and fifty, estimated to cost £8,692, were for Local Fund Boards. All works estimated to cost over £67 require the approval of the Board.

During the year five works of the estimated cost of £948 were deferred by local bodies, principally for lack of funds and twenty-five works of the estimated cost of £3,200 were approved for execution as famine relief works.

General Remarks.

Red Sea Pilgrim Traffic.

During the pilgrim season 1906-07 the Government of India orders, detailed in paragraph 175 of this report for 1905, were in operation. Briefly the orders are, that Bombay shall be the only port of embarkation, that all vessels shall be cleaned and freed from rats, that all pilgrims shall be medically examined and their clothes and baggage disinfected, and that all vessels shall be again medically examined both at Aden and at Perim: in the event of plague making its appearance, the persons attacked shall be landed at Perim and placed in a plague camp. The orders affecting the port of Bombay were duly carried out, the disinfection of vessels being done by a Clayton apparatus, and when one was not available, by burning sulphur in the holds in large iron receptacles at the rate of 3 lbs. per 1,000 cubic feet of space.

The number of pilgrims who left for the Haj during the year was the largest on record, the increase being probably due to the abolition of the segregation camp at Bombay, to which cause the British Vice-Consul at Jeddah adds the circulation of reports of the comparative safety of the roads in Hejaz, and lower passage rates in consequence of rivalry between the shipping companies. The report of the Port Health Officer, Bombay, records the departure between the 19th September and 30th December 1906 of thirty-five ships carrying 27,205 pilgrims, and that of the Protector of Pilgrims, Bombay, of only thirty-four ships with 27,140 pilgrims: the ship "Islami" which sailed on the 19th September 1906 has been omitted in the Protector's report. On the other hand the Vice-Consul mentions in the Haj report the arrival from Bombay of thirty-nine ships with a total of 26,521 pilgrims. The Vice-Consul however takes account of ships which sailed before and after the dates mentioned by the Bombay authorities, and further, distinguishes between Indian pilgrims and those of other nationalities on the same ship, a distinction not made in the Bombay reports. As no report has been furnished from Kamaran it is not possible to make any mention of the health of the pilgrims on the voyage and during the period of detention at Kamaran. The Vice-Consul, referring to the recommendation to reduce the period of detention to five days, states that it has not been carried into effect.

Plague appeared in Jeddah in June 1906; it was quickly stamped out, but reappeared in January 1907. About 400 Indian pilgrims are reported to have died at Jeddah after the Haj: the causes of death are not stated but the mortality is attributed generally to poverty. It appears that half, or even more, of the Indian pilgrims were not provided with sufficient funds and a large number in destitute circumstances remain at Jeddah: the Vice-Consul hazards the conjecture that about 3,000 have remained in the country, this being due in many cases to want of funds to pay for the return journey, the cure for which is an order that all pilgrims shall procure a return ticket before embarkation at Bombay.

It is reported that funds have been provided to improve the water supply at Jeddah and Yembo, but nothing is known as to when the scheme is to be carried into effect.

The pilgrims who returned to Bombay in thirty-three ships between the 15th February and 2nd August 1907, numbered 24,293. Some deaths occurred at sea on every ship, amounting to a total of 412, the principal causes of which were old age, general debility, starvation, pneumonia, dysentery and diarrhœa. In six ships cases of infectious disease occurred during the voyage from Jeddah to Bombay; two were cases of plague, five of small-pox, four of chicken-pox, and one of leprosy. Of these the two cases of plague and one of chicken-pox were landed at Aden, the remaining patients being landed at Bombay and sent to hospital for treatment. Of pilgrims on small-pox infected ships fifty-four were vaccinated, the remainder refusing to accept the operation. The clothing and bedding of 4,180 pilgrims among whom plague and small-pox appeared were disinfected, after which the pilgrims were made over to the Protector of Pilgrims for despatch to their homes.

Laboratories.

At the *Central Research Institute*, Kasauli, the preparation of anti-venene and curative sera was continued and routine bacteriological work in connection with the examination of specimens sent for diagnosis was carried out. During the year 1,728 bottles of antivenene, 1,180 bottles of anti-diphtheritic serum and 400 doses of anti-typhoid vaccine were issued. Anti-tetanus serum is imported from Europe, 532 doses being issued during the year. The routine bacteriological work included the examination for diagnostic purposes of 362 specimens. As regards original research the staff was engaged mainly in carrying on the enquiry regarding the etiology and mode of spread of enteric fever in India, which had been begun in March 1906. The first report on this investigation (which has already been noticed in Section II) has been published as No. 32 of the Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India. Other investigations connected with problems of immunity and of vaccine therapy were in progress at the end of the year, and the investigation of the etiology and mode of spread of dysentery on the lines that proved so successful in the enquiry on enteric fever has been begun.

Since June 1905 the *Bombay Bacteriological Laboratory* has been used (1) as the place where anti-plague vaccine for the whole of India is prepared and issued, (2) as the chief laboratory for plague research in India, and (3) as the provincial bacteriological laboratory for the Bombay Presidency. During 1907 as regards the routine work connected with plague, 620,923 doses of anti-plague vaccine were despatched from the laboratory to places in and beyond India, as compared with 176,651 doses in 1906. The increase was doubtless due chiefly to the unusual prevalence of plague, but it may be hoped that to some extent it indicates greater confidence on the part of the people in this method of prevention. The annual report of the laboratory contains, as usual, a number of examples showing the favourable results of inoculation. As regards research work the members of the Plague Research Commission continued to use the laboratory for their investigations throughout the year. A full summary of the chief results obtained by the Commission was included in Section VI of this report last year. During 1907 a considerable amount of work was done in connection with different plague vaccines, with different disinfectants which can be used for killing fleas and with various poisons and other methods for destroying rats. The experiments with methods for rat destruction included trials of the Danys'z virus and of "Ratin" as well as attempts to kill rats by the use of the Clayton gas apparatus.

The results of the last method showed that rats when confined in cages in an open room, can be readily killed by Clayton gas, but that if they are allowed to move about freely in the room some may escape before the gas becomes sufficiently concentrated to overpower them. Moreover, when the rats are afforded shelter in burrows they may not be killed by the gas. The experiments showed also that it is difficult to kill fleas by means of the apparatus, especially when the fleas are on earth floors. The routine work in connection with plague included the examination for the Health Officer of Bombay of 107,895 rats of which 15,374 were found to be infected with plague. As regards educational work, two booklets, one describing the preparation and use of the anti-plague vaccine, the other containing a popular account of the cause and prevention of plague as revealed by the most recent work on the subject, were widely distributed, and a number of medical practitioners attended a course of instruction in the best method of carrying out the operation of plague inoculation. The routine work of the laboratory as the provincial laboratory for the Bombay Presidency included the examination of over 700 specimens of blood, sputum, urine, and tissues for the diagnosis of typhoid and allied fevers, Malta fever, malaria, relapsing fever, plague, tuberculosis, diphtheria, cancer and rabies. A course of sixteen lectures with practical instruction and work was given to Hospital Assistants, the course lasting six weeks. Bacteriological equipment is supplied from the laboratory to medical officers in the Presidency and sera and vaccines are stocked for issue to those who require them.

The routine work in the Bacteriological Section of the *King Institute of Preventive Medicine, Madras*, included the examination of 1,893 specimens received from medical officers, sanitary authorities, plague officials and others. The specimens were for the diagnosis of plague, malaria, typhoid and allied fevers, Malta fever, relapsing fever, diphtheria, cholera, filariasis, gonorrhœa, infection with intestinal worms, tuberculosis, leprosy, cancer and rabies. In addition 172 were samples of water for chemical and bacteriological examination and eight were specimens of biting flies. As regards research work the value of "pesterine" and other substances for the destruction of fleas was investigated and further important work in protozoology was done. The educational work of the Institute includes, in addition to a course of instruction in minor Sanitary engineering given by the Assistant Sanitary Engineer, a course dealing with the preparation and preservation of vaccine lymph, human and animal vaccination, and demonstrations of diseases in men and animals. During the year ending 31st March 1907, thirty-seven students and six Assistant Surgeons attended this course, which until lately was intended only for Sanitary Inspectors, Vaccinators and Plague Inspectors.

At the *Pasteur Institute*, Kasauli, the steady increase of work was more than maintained during 1907, the largest number of patients in any one year since the establishment of the Institute having been afforded anti-rabic treatment. Of the total of 1,349 persons treated, compared with 1,147 persons during 1906, 433 were Europeans and 196 natives, showing increases of 83 and 119, respectively, compared with the preceding year. Of the European patients, 181 came from the British Army, 66 were British officers, officers' wives and children and 186 civilians; and of the natives, 85 were members of the Native Army and 831 native civilians. Patients came from practically every province and from the Native States of Rajputana and Kashmir; two patients came from

Ceylon, one a European and the other a native. By far the majority of cases were of dog bites, *viz.*, 1,174, but there were no less than 123 cases of jackal bites and small numbers from the bites of other animals, *e. g.*, wolves, cats, horses, etc. There were only six cases of failure to secure immunization, the percentage to total cases being 0·44 which is less than in any previous year.

In addition to anti-rabic treatment and the examination of 302 specimens of the brain or spinal cord of animals suspected of having died of rabies, the Institute as the provincial bacteriological laboratory for the Punjab, undertook the examination of 675 specimens of which 457 were for the serum diagnosis of Enteric and Malta fevers. The fall from 969 in 1906 to 675 in 1907 in the number of specimens sent for examination, is accounted for by the orders issued in the summer of 1907 by the military medical authorities to send all specimens, other than those connected with rabies, to Brigade or Divisional laboratories and not to the Institute as heretofore.

In April 1908, a pamphlet entitled "Rabies and Anti-Rabic treatment in India," by Major G. Lamb, I. M. S., Director of the Institute, was forwarded to local Governments and Administrations with the suggestion that copies might be circulated as widely as possible among all classes of the people, and that the pamphlet, or portions of it, might also be translated into the vernaculars and distributed.

Pasteur Institute of Southern India, Coonoor.—The Institute was open for the reception of patients on the 1st of April 1907, but none arrived till the 6th of the month. Between the opening date and the 29th February 1908, a total of 186 patients were treated, of whom four did not complete the full course, one died on the seventh day of treatment and eight remained under treatment. There was no failure; the one patient who died on the seventh day of treatment came twenty-nine days after having been bitten by a mad jackal and developed hydrophobia before he could be immunised: this case was not therefore reckoned a failure. By classes the 186 patients comprised Europeans 33, Eurasians 28 and natives 125. The British Army furnished nine patients and the Native Army six. The great majority of the patients came from Southern India, but there was one from Bengal, one from the Federated Malay States and nineteen from Ceylon. Thirty-seven specimens of material from animals supposed to be rabid were received for examination, but of these three were so badly-preserved as to be useless. Besides this much attention was devoted to investigations connected with the diagnosis, treatment and causation of rabies.

Bacteriological Department.

In paragraph 178 of this report for 1904, the orders of the Government of India on the scheme for establishing bacteriological laboratories in India were reproduced. In furtherance of the scheme, the Right Hon'ble the Secretary of State for India, towards the close of 1907, sanctioned proposals for placing the various existing appointments connected with the bacteriological laboratories in the country on a definite footing and for the creation of certain additional appointments. The department comprises twelve appointments which are distributed between the Central Research Institute at Kasauli; the Bombay Bacteriological Laboratory at Parel, Bombay; the King Institute of Preventive Medicine at Guidny, Madras; the Pasteur Institute at Kasauli; and the

Southern India Pasteur Institute at Coonoor, Madras Presidency. The officer in charge of each of these institutions is designated Director, and the other officers attached to them are to be known as Assistants to the Director.

Special Enquiries.

Plague.—The special investigations on plague which were begun in April 1905 under the direction of an Advisory Committee representing the India Office, the Royal Society and the Lister Institute, are being carried on continuously. Major G. Lamb, I.M.S., is now a member of the Advisory Committee and Captain W. G. Liston, I.M.S., of whose work in connection with the mode of spread of plague it is impossible to overestimate the importance, is now the senior member of the working Commission in India. The other officers at present engaged on the enquiries are Captains T. H. Gloster, J. C. G. Kunhardt and F. N. White, I.M.S.

The reports of the investigations are being published in special numbers of the *Journal of Hygiene*, and last year a comprehensive summary of the work done and the results achieved was written by Major Lamb. This summary has been published as a pamphlet entitled, *The Etiology and Epidemiology of Plague*, and copies have been widely circulated. In a future edition the further work of the Commission will be included.

Enteric fever.—The first report of the results obtained in the investigation of the etiology and mode of spread of enteric fever in India, carried out at the Central Research Institute, was published in February 1908 as No. 32 of the new series of the Scientific Memoirs. The chief results obtained have already been summarized in Section II of the present report.

Dysentery.—The deputation of Captain W. C. H. Forster, I.M.S., for the investigation of the causation, prevention and treatment of dysentery in the prisons and lunatic asylums of India terminated in July 1908. A separate investigation has been begun by the Director and staff of the Central Research Institute.

Malaria and Blackwater fever.—The enquiry referred to in the last issue of this report, regarding the causes of sickness and death in the Duars, which includes as one of its most important problems the cause and prevention of blackwater fever, has been carried on continuously since July 1907, and the first report to the Advisory Committee which, under the orders of the Government of India, has the conduction of the enquiry, is about to be published. This report deals entirely with blackwater fever and has been written by Captain S. R. Christophers, I.M.S., and Dr. Bentley who have been jointly engaged upon the subject since December 1907. The report is long and it would not be fair to the officers who have laboured with so much zeal at the work, to attempt to summarize in a few words the main features of the investigation; the whole of the report should be read carefully by all who desire a right understanding of the cause and mode of prevention of the disease. The conclusions reached by the authors, though highly important, are by no means startling, and among those whose knowledge of blackwater fever has been attained not by investigation in the places where it occurs, there will doubtless be some who will still cling fondly to the notion that the disease is due to a special and as yet undiscovered parasite. In the report there are a few remarks stating the results already obtained in the prevention of blackwater fever in the Duars. These should serve to convince all impartial persons that the conclusion as to the cause of the disease arrived at by the authors is correct.

It has been decided that the second report to the Committee shall deal with malaria as a cause of sickness and death in the Duars. Upon this subject a number of new and highly interesting observations have been made.

Lathyrism.—With a view to determine the nature and cause of this disease arrangements were made for the supply from the Central Provinces to the Director of the Central Research Institute, Kasauli, of a quantity of the grain "Teora" (*Lathyrus sativus*). Experiments connected with the investigation were commenced in May 1908 and are in progress.

Jail Dietaries.—In January 1908 Capatin D. McCay, I.M.S., Professor of Physiology in the Medical College, Calcutta, was entrusted, in addition to his other duties, with a preliminary investigation regarding the suitability of the Jail dietaries in Bengal. Captain McCay has been afforded the necessary assistance and facilities for his enquiry which is still progressing.

Mr. W. M. Haffkine, C.I.E., returned to India in the beginning of 1908, and is engaged on scientific research at the laboratory attached to the office of the Sanitary Commissioner with the Government of India, which is located in the grounds of the Presidency General Hospital at Calcutta.

Scientific Publications.

Since the issue of the last report the following numbers of the Scientific Memoirs have been published by the Sanitary Commissioner with the Government of India:—No. 31, *The development of the Leishman-Donovan parasite in cimex rotundatus*, second report, by Captain W. S. Patton, I. M. S.; No. 32, *An enquiry on Enteric Fever in India* carried out at the Central Research Institute, Kasauli, under the direction of Lieutenant-Colonel D. Semple, M. D., and Captain E. D. W. Greig, I. M. S.; No. 33, *The Production of Alkali in Liquid Media by the Bacillus Pestis*, by Lieutenant-Colonel W. B. Bannerman, I.M.S.; No. 34, *Standards of the constituents of the urine and blood and the bearing of the metabolism of Bengalis on the problems of nutrition*, by Captain D. McCay, I.M.S.

A revised (third) edition of the pamphlet on the *Causation and Prevention of Malarial Fevers*, by Major S. P. James, I.M.S., has been prepared and distributed at a nominal price to Assistant Surgeons, Hospital Assistants and medical students in India.

A Bulletin, No. 7, entitled "*A preliminary account of the biting flies of India*" was published by the Imperial Entomologist to the Government of India, and copies have been distributed to provincial officers who might be likely to find them useful.

A pamphlet on the *House Rats of India* is in course of preparation and will be published by the authorities of the Indian Museum, Calcutta.

C. J. BAMBER, *Lieut.-Colonel, I.M.S.*,

Offg. Sanitary Commissioner with the Government of India.

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* Under the Orders of the War Office these tables are no longer compiled for India.

EUROPEAN TROOPS.

TABLE I.—SUMMARY, SICKNESS AND MORTALITY.

A.—ARMIES AND DIVISIONS.	Years.	Average strength.	RATIO PER MILLE OF STRENGTH.												
			Admissions into hospital.	Constantly sick.	Deaths.	Invaliding.	DEATHS FROM								
							Cholera.	Small-pox.	Enteric Fever.	Heat-stroke.	Tubercle of the lungs.	Pneumonia.	Dysentery.	Abscess of the liver.
Northern Army	1906	37,549	836	51	9·51	33	·31	·05	3·17	·61	·21	·40	·35	1·17
	1907	36,554	744	46	8·34	32	·05	...	2·60	·68	·27	·41	·33	·90
Southern Army ...	1906	31,338	929	54	11·65	36	·83	·06	3·36	·51	·13	·26	·77	2·02
	1907	32,065	788	50	8·32	31	...	·03	3·13	·03	·13	·29	·35	1·19
1st (Peshawar) Division ...	1906	2,822	2,290	55	8·15	47	...	·35	2·48	2·83	...	...	·35	·35
	1907	2,678	2,158	61	4·84	27	...	...	2·02	...	·40	·40	...	·40
2nd (Rawalpindi)	1906	6,858	750	42	7·73	25	...	...	1·04	·29	·44	·58	·73	1·31
	1907	7,370	728	43	6·16	20	...	...	2·20	·14	...	·41	·28	·83
3rd (Lahore)	1906	5,679	1,178	46	9·69	18	...	·18	3·10	·89	·71	·23	·22	·78
	1907	8,210	648	38	7·38	22	·12	...	2·53	·80	·24	·61	·16	·85
4th (Quetta)	1906	1,099	962	47	10·25	35	...	·24	1·95	·49	...	·73	·24	2·44
	1907	4,822	784	41	9·46	29	...	...	2·26	...	...	·23	·23	·45
5th (Mhow)	1906	7,060	1,060	55	10·01	46	·14	·14	7·08	·99	·28	...	1·84	1·98
	1907	6,731	861	45	10·40	39	...	...	5·04	...	...	·15	·30	1·19
6th (Poona)	1906	6,647	791	48	10·68	24	·89	...	2·86	·15	...	...	·30	2·86
	1907	6,838	723	48	7·46	20	...	·15	2·63	·15	·89	...	·44	1·03
7th (Meerut)	1906	8,933	839	53	9·63	23	·22	...	4·03	·34	·11	·67	·11	·90
	1907	8,466	821	52	9·57	30	...	...	4·02	·23	·35	·35	·35	·83
8th (Lucknow)	1906	9,919	816	55	11·39	27	1·01	...	5·43	·30	·30	·30	·40	1·92
	1907	9,628	667	45	10·28	24	·10	...	1·87	1·04	·31	·73	·62	1·45
9th (Secunderabad)	1906	8,520	927	62	9·62	32	1·17	...	3·17	·12	·12	·12	·23	1·88
	1907	8,135	780	62	7·99	35	...	...	3·40	...	·25	·37	·25	1·78
Burma Division ...	1906	3,852	898	53	9·86	19	2·34	...	·26	·26	·26	·26	1·04	·78
	1907	3,800	761	46	8·16	21	...	...	·79	...	...	·79	·79	1·32
Aden Brigade ...	1906	1,078	1,204	63	16·70	154	...	...	...	3·71	...	...	1·86	1·86
	1907	1,099	850	43	7·28	63	...	...	...	...	...	·91	...	·91
INDIA	1906	70,272	871	51	10·43	28	·65	·05	3·19	·55	·17	·28	·53	1·58
	1907	69,332	756	46	8·18	26	·03	·01	2·27	·38	·20	·35	·35	1·01

B.—GEOGRAPHICAL GROUPS.	Years.	Average strength.	RATIO PER MILLE OF STRENGTH.												
			Admissions.	Constantly sick.	ADMISSIONS FROM										
					Influenza.	Cholera.	Small-pox.	Enteric Fever.	Intermittent Fever.	Remittent Fever.	Simple continued Fever.	Pneumonia.	Dysentery.	Venereal diseases.
Group I.—Burma Coast and Bay Islands.	1894-1903	1,145	1,350	60	45·3	·2	·3	8·2	181·9	6·0	46·6	1·5	46·2	507·0
	1906	1,375	866	48	2·2	...	1·5	...	42·2	8·0	165·1	·7	23·5	209·5
	1907	1,394	926	56	2·3	...	...	...	70·3	16·2	166·2	·8	19·3	135·2
II.—Burma Inland ...	1894-1903	2,391	1,431	92	3·4	·3	·2	4·3	313·9	24·3	48·7	8·3	25·5	447·2
	1906	1,609	943	56	8·1	13·1	...	2·7	97·0	1·2	90·1	1·8	9·9	107·6
	1907	1,717	778	45	3·5	...	...	5·2	72·0	·6	68·9	·6	13·3	148·2
IV.—Bengal and Orissa ...	1894-1903	2,163	1,376	83	5·8	1·9	·2	10·6	261·2	34·5	30·7	2·6	66·2	287·6
	1906	2,775	1,190	77	8·8	...	·6	8·8	238·0	1·2	87·3	5·2	16·9	262·5
	1907	3,553	1,791	55	5·6	...	2·0	4·1	148·5	...	94·2	7·7	18·4	189·5
V.—Gangetic Plain and Chutia Nagpur.	1894-1903	6,693	2,262	89	9·5	4·9	1·1	28·6	216·9	3·6	47·2	8·3	39·4	446·7
	1906	6,871	788	52	12·6	1·9	2·5	23·2	197·1	·6	58·7	3·1	14·6	107·3
	1907	6,556	677	43	·9	·2	·2	11·0	84·2	1·5	44·4	2·1	16·9	95·6
VI.—Upper Sub-Himalaya ...	1894-1903	12,886	1,358	84	3·7	·7	·5	24·6	395·3	9·6	59·7	6·2	21·2	365·5
	1906	13,089	886	53	5·5	·1	·6	15·4	200·9	·5	64·3	4·5	7·9	101·7
	1907	13,391	798	45	6·5	·1	·2	13·2	196·7	1·4	43·8	3·9	6·4	72·3
VII.—North-Western Frontier, Indus Valley, and North-Western Rajputana.	1894-1903	4,791	1,490	79	2·0	·1	·7	19·2	573·8	41·1	26·7	6·8	18·0	209·6
	1906	4,975	1,252	55	64·7	...	2·4	9·4	543·0	·4	74·6	1·4	5·6	86·6
	1907	4,931	1,062	55	89·8	...	1·7	7·4	391·5	1·1	25·8	1·3	3·7	64·3
VIII.—South-Eastern Rajputana, Central India & Gujarat.	1894-1903	5,892	1,555	98	2·7	1·1	·8	34·6	430·1	10·8	30·4	3·2	23·2	439·6
	1906	6,249	1,037	55	28·6	·3	4·3	36·9	389·5	2·9	28·3	4·5	17·8	118·7
	1907	5,730	842	45	9·9	...	...	23·4	241·7	4·2	19·7	1·4	16·2	82·9
IX.—Deccan	1894-1903	9,371	1,258	84	10·2	·8	·6	20·8	251·6	7·1	24·8	3·4	26·7	458·8
	1906	10,188	755	49	2·0	1·9	·6	21·5	88·2	·8	53·8	2·7	30·8	135·0
	1907	10,250	709	48	1·3	...	·5	18·1	89·8	...	33·5	1·9	19·6	96·9
X.—Western Coast ...	1894-1903	1,573	988	69	1·1	·1	·3	6·4	132·1	7·8	34·7	2·7	13·9	354·0
	1906	1,444	817	57	·7	...	...	2·8	182·6	...	7·6	·7	11·8	217·5
	1907	1,372	738	53	...	·7	...	2·2	188·8	...	9·5	·7	8·0	140·7
XI.—Southern India ...	1894-1903	3,870	1,192	73	9·5	·3	·7	14·3	152·2	8·2	44·0	2·8	29·4	421·8
	1906	3,802	1,016	50	3·2	·5	2·1	15·6	68·7	...	50·5	·5	20·5	178·9
	1907	3,537	809	50	·8	...	·3	23·5	42·8	...	34·2	4·2	29·2	154·7
XIIa.—Hill Stations ...	1894-1903	8,778	1,026	70	6·6	·3	·1	29·4	166·7	8·1	14·7	5·2	17·0	221·8
	1906	11,233	675	41	4·6	·2	·2	7·2	65·2	45·9	60·6	2·9	4·6	77·9
	1907	11,089	635	39	19·3	...	·3	13·0	98·6	3·2	28·2	2·7	6·1	54·4
XIIb.—Hill Convalescent Depots and Sanitaria.	1894-1903	3,075	1,226	84	6·4	·2	·1	15·3	284·2	8·2	9·4	4·3	21·1	298·0
	1906	3,392	807	58	3·2	...	1·4	12·0	93·9	1·2	24·2	4·7	15·9	104·1
	1907	3,515	797	62	4·8	...	...	8·0	176·1	·9	8·8	1·4	10·0	101·8
INDIA	1894-1903	66,881	1,293	80	6·3	1·0	·5	23·9	241·2	13·5	27·2	4·3	27·5	385·5
	1906	70,272	871	51	11·4	2·0	1·2	15·6	176·2	3·4	55·7	3·4	15·2	117·3
	1907	69,332	756	46	12·5	·0	·4	13·7	152·0	1·8	36·8	2·8	11·7	89·9

EUROPEAN TROOPS.

TABLE II.—RATIO OF ARMIES, 1907.

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.		
	Northern Army.	Southern Army.	India.*
I.—STRENGTH	36,551	31,026	69,332
II.—†CONSTANTLY-SICK-RATE OF EACH MONTH—			
January	38·4	38·9	38·1
February	46·9	50·9	49·8
March	40·8	48·6	43·6
April	38·0	45·8	40·7
May	40·4	45·7	42·4
June	40·6	45·7	43·9
July	45·6	48·7	47·0
August	47·8	52·8	50·0
September	47·9	52·7	49·8
October	46·6	50·0	47·3
November	52·8	46·6	46·4
December	45·9	43·5	43·2
OF THE YEAR	45·7	49·6	46·4
III.—ADMISSION RATE OF THE YEAR—			
Influenza	21·9	1·9	12·5
Cholera	·1	·03	·04
Small-pox	·05	·3	·4
Enteric Fever	12·2	14·2	13·1
Intermittent Fever	130·2	144·7	132·0
Remittent Fever	1·5	2·2	1·8
Simple Continued Fever	32·0	43·8	36·8
Tubercle of the lungs	1·9	1·4	1·6
Pneumonia	3·0	2·6	2·8
Other Respiratory Diseases	22·9	24·1	21·9
Dysentery	8·5	15·8	11·7
Diarrhœa	13·3	16·4	14·6
Hepatic Abscess	2·9	2·9	2·4
„ Congestion and Inflammation	12·3	9·3	10·8
Venereal Diseases	80·1	102·7	89·9
ALL CAUSES	743·5	785·7	756·4
IV.—DEATH RATE OF THE YEAR—			
Cholera	·05	·····	·03
Small-pox	·····	·03	·01
Enteric Fever	2·60	3·13	2·77
Intermittent Fever	·14	·13	·13
Remittent Fever	·01	·13	·07
Simple Continued Fever	·····	·····	·····
Heat-stroke	·68	·03	·38
Circulatory Diseases	·44	·84	·61
Tubercle of the lungs	·27	·13	·20
Pneumonia	·41	·29	·35
Other Respiratory Diseases	·11	·13	·12
Dysentery	·33	·35	·33
Diarrhœa	·····	·····	·····
Hepatic Abscess	·90	1·19	1·01
ALL CAUSES	8·34	8·32	8·29
V.—PERCENTAGE IN 100 ADMISSIONS—			
Influenza	2·95	·24	1·65
Cholera	·01	·00	·01
Small-pox	·07	·03	·06
Enteric Fever	1·64	1·81	1·74
Intermittent Fever	21·41	18·42	20·10
Remittent Fever	·20	·28	·24
Simple Continued Fever	4·31	5·57	4·87
Tubercle of the lungs	·25	·18	·22
Pneumonia	·40	·34	·37
Other Respiratory Diseases	3·08	2·69	2·90
Dysentery	1·15	2·01	1·55
Diarrhœa	1·79	2·09	1·93
Hepatic Abscess	·25	·37	·31
„ Congestion and Inflammation	1·65	1·18	1·43
Venereal Diseases	10·78	13·07	11·89
VI.—PERCENTAGE IN 100 DEATHS—			
Cholera	·7	·····	·4
Small-pox	·····	·4	·2
Enteric Fever	31·1	37·6	33·9
Intermittent Fever	1·6	1·6	1·6
Remittent Fever	·3	1·6	·9
Simple Continued Fever	·····	·····	·····
Heat-stroke	8·2	·4	4·6
Circulatory Diseases	5·2	10·1	7·4
Tubercle of the lungs	3·3	1·6	2·5
Pneumonia	4·9	3·3	4·2
Other Respiratory Diseases	1·3	1·6	1·4
Dysentery	3·9	4·3	4·1
Diarrhœa	·····	·····	·····
Hepatic Abscess	10·8	14·3	12·3

* Including troops on the line of march.
† Worked on the aggregates.

EUROPEAN TROOPS.

TABLE III.—RATIOS OF GEOGRAPHICAL GROUPS, 1907.

	Ratios per 1,000 of the Average Strength.												
	I Burma Coast and Bay Islands.	II Burma Inland.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Uppat Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XIIa Hill Stations.	XIIb Hill Convalescent Depots and Sanitaria.	India.
I.—STRENGTH	1,294	1,727	1,953	6,556	13,391	4,621	5,730	19,260	1,372	3,537	11,689	3,515	69,338
II.—CONSTANTLY-SICK-RATE OF EACH MONTH—													
January	40·7	59·4	45·3	42·5	56·1	24·6	61·8	58·5	57·0	68·9	55·1	84·9	55·1
February	43·3	49·8	58·0	37·2	48·3	59·3	47·3	62·8	58·1	70·6	49·4	69·9	49·8
March	43·1	31·1	65·4	39·6	36·5	45·2	43·1	53·6	56·1	61·9	33·7	50·3	43·6
April	56·7	31·8	55·4	46·3	35·4	37·5	47·6	45·9	43·5	63·9	39·0	45·3	40·7
May	52·2	40·6	40·8	42·4	42·1	49·2	48·9	41·2	51·8	57·9	32·3	49·9	42·4
June	38·4	48·2	39·3	43·1	37·1	49·4	39·8	40·9	56·7	54·1	37·9	52·8	42·9
July	47·6	40·1	43·6	52·0	45·3	54·3	41·5	45·3	62·8	59·1	38·9	60·0	47·0
August	56·3	45·8	55·0	47·6	45·4	59·8	44·3	47·0	59·7	66·2	42·8	70·4	50·0
September	47·8	50·5	71·0	45·9	49·5	56·2	44·6	49·2	46·1	61·9	43·1	72·0	49·8
October	37·5	38·2	70·4	49·7	46·7	61·0	44·6	45·7	48·5	58·8	39·7	67·3	47·3
November	36·8	47·8	57·3	42·3	54·5	54·9	44·4	44·8	45·7	48·4	43·4	112·5	46·4
December...	45·1	52·3	63·1	38·4	47·3	52·0	29·7	40·5	49·4	53·5	34·7	67·2	42·2
OF THE YEAR ...	45·5	45·0	54·6	43·4	44·6	55·3	44·7	48·3	52·8	60·4	39·0	62·4	46·4
III.—ADMISSION RATE OF THE YEAR—													
Influenza	2·3	3·5	5·6	·9	6·5	89·8	9·9	1·3	...	·8	19·3	4·8	12·5
Cholera	...	...	...	·2	·1	...	...	...	·7	...	...	...	·04
Small-pox	...	...	2·0	·3	·3	1·7	...	·5	...	·3	...	...	·4
Enteric Fever	...	5·2	4·1	11·0	13·5	7·4	23·4	18·1	2·2	21·5	13·0	8·0	13·2
Intermittent Fever ...	70·3	77·0	128·5	84·2	196·7	391·5	241·7	89·8	188·8	42·1	98·6	176·1	132·0
Remittent Fever	16·2	·6	...	1·5	1·4	1·1	4·2	...	...	...	3·1	·9	1·8
Simple Continued Fever ...	166·2	68·9	94·2	42·4	43·5	25·8	19·7	33·5	9·5	34·2	28·1	8·8	36·8
Rheumatic Fever	...	...	...	...	·4	·4	...	·8	...	1·1	3·3	·3	·9
Tubercle of the lungs ...	·8	1·2	3·1	2·4	1·7	1·5	1·4	1·0	·7	·8	1·3	4·6	1·6
Pneumonia	·8	·6	7·7	2·1	3·9	4·3	2·4	3·9	·2	4·2	2·7	1·4	2·8
Other Respiratory Diseases ...	10·0	8·1	27·1	20·1	26·7	27·3	23·0	20·7	15·3	24·6	19·9	20·5	21·9
Dysentery	19·3	13·3	18·4	16·0	6·4	3·7	16·2	19·4	8·0	19·2	6·1	10·0	11·7
Diarrhœa	7·7	9·8	9·2	10·8	15·2	23·2	21·8	45·9	13·8	14·7	10·5	10·5	14·6
Hepatic { Abscess ... ... Congestion and Inflammation.	8·5	2·9	3·6	2·7	2·0	·9	2·6	3·3	·7	2·0	1·2	4·3	2·4
Venereal Diseases	3·2	11·0	13·4	46·8	10·5	6·9	41·2	9·8	8·2	11·3	8·5	16·5	10·8
	135·2	148·2	189·5	95·6	72·3	64·3	82·9	96·9	148·7	154·7	54·4	101·8	89·9
ALL CAUSES ...	726·4	737·6	790·6	636·6	793·6	1,061·7	842·1	709·3	739·6	806·9	625·4	796·6	756·4
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	·25	·07	...	...	...	...	...	...	...	·03
Small-pox	...	...	...	...	...	...	...	·10	...	...	...	...	·01
Enteric Fever	...	1·16	1·54	2·29	2·91	1·51	2·50	4·48	·73	2·83	1·99	·85	2·77
Intermittent Fever ...	...	...	...	...	·15	·43	·35	...	...	...	·09	·57	·13
Remittent Fever	2·32	...	...	...	·07	...	...	...	...	...	·09	...	·07
Simple Continued Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Heat-Stroke	...	...	1·02	1·22	·75	·22	·76	·10	...	...	...	...	·38
Circulatory Diseases... ...	1·55	...	1·54	·61	·52	·22	·54	·68	...	·57	·51	·57	·61
Tubercle of the lungs ...	...	...	·51	1·31	·22	·22	·17	...	...	...	·17	·85	·20
Pneumonia	·77	...	2·56	·31	·45	·43	·33	...	...	·85	·17	...	·35
Other Respiratory Diseases	...	...	...	·46	...	...	·17	...	...	·57	·17	...	·12
Dysentery	2·32	...	...	·92	·30	...	·35	·39	...	·28	·26	...	·33
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	...	...
Hepatic Abscess	1·55	1·16	2·56	1·22	1·12	·22	1·05	1·36	...	1·41	·43	1·71	1·01
ALL CAUSES ...	13·14	2·90	15 87	9·76	9·63	5·19	16·39	8·97	3·64	8·20	5·39	6·26	8·18
V.—PERCENTAGE IN 100 ADMISSIONS—													
Influenza	·32	·45	·71	·14	·81	8·46	1·18	·18	...	·11	3·09	·61	1·65
Cholera	...	...	...	·02	·01	...	...	...	·20	...	...	...	·0
Small-pox	...	...	·26	·05	·04	·16	...	·07	...	·04	·05	...	·06
Enteric Fever	...	·67	·52	1·62	1·69	·69	2·78	2·56	·30	2·66	2·08	1·00	1·74
Intermittent Fever ...	9·69	9·99	16·26	12·44	24·66	36·88	28·70	12·66	25·59	5·22	15·77	22·11	20·10
Remittent Fever	2·23	·07	...	·23	·18	·10	·59	...	...	...	·49	·11	·24
Simple Continued Fever ...	22·87	8·96	11·92	6·32	5·46	2·43	2·34	4·73	1·28	4·24	4·50	1·48	4·89
Rheumatic Fever	...	...	...	...	·06	·04	...	·11	...	·14	·52	·04	·11
Tubercle of the lungs ...	·11	·15	·39	·36	·22	·14	·15	·14	·10	·11	·21	·57	·22
Pneumonia	·11	·97	·97	·32	·40	·41	·29	·27	·10	·53	·42	·28	·37
Other Respiratory Diseases	1·38	1·04	3·43	2·98	3·35	2·57	2·74	2·91	2·08	3·05	3·19	2·57	2·90
Dysentery	2·66	1·71	2·33	2·50	·81	·35	1·93	2·73	1·09	2·38	·97	1·25	1·55
Diarrhœa	1·06	1·23	1·17	1·60	2·90	2·18	2·59	2·24	1·88	1·82	1·68	1·32	1·93
Hepatic { Abscess ... ... Congestion and Inflammation.	1·17	·37	·45	·41	·25	·08	·31	·47	·10	·25	·19	·54	·31
Venereal Diseases	·43	1·41	1·94	2·48	1·82	·65	1·35	1·39	1·19	1·40	1·35	2·07	1·43
	18·62	19·06	23·90	14·13	9·06	6·05	9·84	13·66	20·16	19·17	8·70	12·79	11·89
VI.—PERCENTAGE IN 100 DEATHS—													
Cholera	...	...	...	2·6	·8	...	...	...	...	...	...	...	·4
Small-pox	...	...	...	...	...	...	...	1·1	...	...	...	...	·2
Enteric Fever	...	40·0	9·7	23·4	30·2	29·2	60·6	39·0	20·0	34·5	36·5	13·6	33·9
Intermittent Fever ...	...	...	...	...	2·6	8·3	2·8	...	...	...	1·6	9·1	1·6
Remittent Fever	17·6	...	...	...	·8	...	...	...	...	...	1·6	...	·9
Simple Continued Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Heat-stroke	...	...	6·5	22·5	7·8	4·2	5·6	1·1	...	...	...	...	4·6
Circulatory Diseases ...	11·8	...	9·7	6·3	5·4	4·2	4·2	7·6	...	6·9	9·5	9·1	7·4
Tubercle of the lungs ...	...	...	3·2	3·1	2·3	4·2	1·4	...	...	...	3·2	13·6	2·5
Pneumonia	5·9	...	16·1	3·4	4·7	8·3	2·8	...	...	10·3	3·2	...	4·2
Other Respiratory Diseases	...	...	...	4·7	...	...	1·4	...	...	6·9	3·2	...	1·4
Dysentery	17·6	...	...	9·4	3·1	...	2·8	4·3	...	3·4	4·8	...	4·14
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	...	...
Hepatic Abscess	11·8	40·0	16·1	12·5	11·6	4·2	8·5	15·2	...	17·2	7·9	27·3	12·3

* Worked on the aggregates.

*TABLE V.—ADMISSION AND DEATH RATES FROM ENTERIC FEVER IN STATIONS OF OVER 1,000 IN STRENGTH.

Stations.	1907.		DECENNIUM, 1894-1903.		Stations.	1907.		DECENNIUM, 1894-1903.	
	Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.		Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.
Bangalore	28·2	3·19	21·5	4·58	Bareilly	11·4	...	22·8	4·17
Ranikhet	27·4	4·57	31·2	4·88	Chakrata	30·6	2·44	31·3	4·37
Ahmednagar ...	26·4	9·43	36·4	7·97	Meerut	9·8	2·17	35·3	10·87
Mhow	22·3	6·85	38·7	8·40	Peshawar	7·8	1·43	33·9	13·19
Secunderabad ...	20·6	5·07	22·1	5·15	Ambala	7·2	1·27	37·3	9·50
Sialkot	18·5	4·64	15·2	5·06	Wellington ...	5·9	...	11·5	3·21
Quetta	17·6	3·09	33·8	8·08	Fort William ...	5·7	1·49	4·6	1·19
Belgaum	15·2	·95	5·3	1·76	Aden	3·6	...	6·3	2·69
Rawalpindi	12·5	1·10	24·0	5·80	Colaba	·9	·95	3·8	1·93
Lucknow	12·2	2·53	37·9	9·88	Karachi	·8	·79	5·3	1·44
Poona	12·1	2·63	18·7	5·38					

TABLE VI.—ARRIVALS, AGE AND LENGTH OF RESIDENCE IN RELATION TO VENEREAL DISEASES AND ENTERIC FEVER.

YEAR.	ARRIVED IN INDIA.*		YEAR.	MEN.							RATIO PER CENT. OF TOTAL ADMISSIONS.	
				PER CENT. OF STRENGTH.				RATIO PER 1,000.				
				Age.	Length of residence.	Married ‡	Strength.	Admissions.				
	Men.	Women.		Under 25 years.	Under 5 years.			All causes.	Venereal Diseases.	Enteric fever.	Venereal Diseases.	Enteric Fever.
1888-89	12,407	506	1888	50	76	5·65	68,887	1,381·7	370·6	13·6	26·82	·99
1889-90	12,279	532	1889	49	78	3·60	69,266	1,498·0	481·5	22·9	32·14	1·53
1890-91	14,046	542	1890	50	80	3·70	67,823	1,520·2	503·5	18·3	33·12	1·22
1891-92	15,456	529	1891	51	79	3·36	67,039	1,379·1	490·7	20·4	29·06	1·48
1892-93	15,894	540	1892	51	80	3·29	68,137	1,517·3	409·9	22·1	27·01	1·46
1893-94	15,090	482	1893	53	79	3·29	70,091	1,414·9	466·0	20·0	32·94	1·41
1894-95	15,957	517	1894	54	81	...†	71,082	1,508·0	511·4	20·9	33·91	1·38
1895-96	14,346	654	1895	55	83	...	71,081	1,461·8	522·3	26·3	35·73	1·80
1896-97	14,805	545	1896	56	82	...	70,484	1,386·7	511·6	25·5	36·89	1·84
1897-98	16,227	543	1897	55	84	...	68,395	1,556·9	485·7	32·4	31·20	2·08
1898-99	16,912	648	1898	54	81	...	67,741	1,436·9	362·9	36·9	25·26	2·57
1899-1900	3,369	168	1899	53	78	...	67,697	1,148·7	313·4	20·6	27·28	1·79
1900-01	5,958	185	1900	45	69	...	60,553	1,143·2	298·1	16·0	26·07	1·40
1901-02	18,594	438	1901	42	63	...	60,838	1,304·3	276·0	12·8	24·99	1·16
1902-03	24,840	961	1902	43	68	...	60,540	1,078·4	281·4	16·7	26·09	1·55
1903-04	15,126	758	1903	51	76	...	70,445	1,033·4	247·6	19·6	23·90	1·90
1904-05	16,366	820	1904	52	80	...	71,083	900·4	198·5	19·6	22·05	2·18
1905-06	15,128	804	1905	52	84	...	71,343	834·3	153·7	16·1	18·42	1·93
1906-07	18,636	912	1906	52	84	...	70,372	870·8	117·3	15·6	13·47	1·7
1907-08	16,083	1,049	1907	...†	...†	...	69,332	756·4	89·9	23·1	11·89	3·74

*In ordinary years the departures plus the deaths nearly balance the arrivals. † Return abolished. ‡ On the 1st May of each year.

EUROPEAN TROOPS.

TABLE IX.—STATISTICS OF OFFICERS.

A.—SICKNESS AND MORTALITY AMONG OFFICERS OF THE BRITISH ARMY IN 1907. (FROM THE MEDICAL RETURNS OF THE ARMY).

	Northern Army.		Southern Army.		India.*	
STRENGTH	1,093		1,043		2,304	
CASES REMAINING FROM 1906	26		38		62	
	Ratios.	Actuals.	Ratios.	Actuals.	Ratios.	Actuals.
CONSTANTLY SICK	26·3	28·71	26·7	27·80	25·6	56·52
INVALIDS	53·06	58	61·36	64	55·35	122
ADMISSIONS.						
Influenza	34·8	38	11·5	12	22·7	50
Cholera	...	...	...	...	...	...
Small-pox	...	...	·10	1	·5	1
Enteric Fever	19·2	21	20·1	21	19·1	42
Intermittent Fever	104·3	114	97·8	102	100·3	221
Remittent Fever	1·8	2	3·8	4	2·7	6
Simple Continued Fever	42·2	46	44·1	46	41·7	92
Tubercle of the lungs	...	...	1·0	1	·5	1
Pneumonia	...	...	...	...	·5	1
Other Respiratory Diseases	14·6	16	21·1	22	17·2	38
Dysentery	11·9	13	23·0	24	16·8	37
Diarrhœa	21·0	23	30·7	32	25·0	55
Hepatic Abscess	...	...	1·0	1	·5	1
Congestion and Inflammation	10·1	11	26·8	28	17·7	39
Venereal Diseases	1·8	2	1·9	2	1·8	4
ALL CAUSES	634·90	694	656·8	685	633·4	1,396
DEATHS.						
Cholera	...	...	...	...	...	...
Small-pox	...	...	...	...	...	...
Enteric Fever	1·83	2	·96	1	1·36	3
Intermittent Fever	...	...	...	...	·45	1
Remittent Fever	...	...	...	...	·45	1
Simple Continued Fever	...	...	...	...	...	...
Heat-stroke	...	...	...	...	...	...
Circulatory Diseases	...	...	...	...	...	...
Tubercle of the lungs	...	...	...	...	...	...
Pneumonia	...	...	...	...	·45	1
Other Respiratory Diseases	...	...	...	...	...	...
Dysentery	...	...	·96	1	·45	1
Diarrhœa	...	...	...	...	...	...
Hepatic Abscess	...	...	1·92	2	·91	2
ALL CAUSES	9·15	10	6·71	7	7·71	17
DEATHS OUT OF HOSPITAL	3·66	4	1·92	2	2·72	6

* Including officers on the line of march.

B.—CAUSES OF DEATH AMONG EUROPEAN OFFICERS OF THE BRITISH AND INDIAN ARMIES IN 1907. (FROM NON-MEDICAL SERVICES.)

ARMIES.	Strength in India, whether on leave or not, on the 1st of July 1907.	Strength in Europe or beyond sea on 1st July 1907, whether on furlough or sick leave.	IN INDIA. Cholera.	Small-pox.	Enteric Fever.	Intermittent Fever.	Remittent Fever.	Simple Continued Fever.	Heat-stroke.	Circulatory Diseases.	Tubercle of the lungs.	Pneumonia.	Other Respiratory Diseases.	Dysentery.	Diarrhœa.	Hepatic Abscess.	TOTAL.	Deaths in England and other countries.	Deaths at sea.	GRAND TOTAL.	Ratio per 1,000.
BRITISH	2,020	636	...	...	3	1	1	...	...	...	...	1	...	1	...	2	17	4	...	21	5·90
INDIAN	3,159	926	...	...	4	...	...	...	...	...	2	1	...	1	...	1	22	12	...	34	8·32

NATIVE TROOPS.

TABLE X.—SUMMARY, SICKNESS AND MORTALITY.

A.—ARMIES AND DIVISIONS.	Years.	Average strength.	RATIO PER MILLE OF STRENGTH. Admissions into hospital.	Constantly sick.	Deaths from: Cholera.	Small-pox.	Enteric fever.	Remittent fever.	Tubercle of the lungs.	Pneumonia.	Dysentery.	Abscess of the liver.	All causes.	Mortality including absent deaths.*
Northern Army	1906	62,453	740	25	·21	·02	·27	·42	·75	1·91	·14	·05	6·45	
	1907	61,163	712	24	·08	·03	·39	·38	2·62	·20	·05	7·28		
Southern Army	1906	50,885	687	23	·90	·06	·33	·28	·22	1·20	·24	·12	7·61	
	1907	50,484	584	21	·38	·06	·40	·36	·39	1·64	·18	·10	5·68	
1st (Peshawar) Division ...	1906	9,850	782	23	...	...	·10	·61	·30	2·43	·20	...	5·98	
	1907	9,198	835	27	...	...	·22	·22	·11	5·00	·22	...	10·00	
2nd (Rawalpindi) Division ...	1906	10,800	790	28	...	...	·46	·19	1·39	2·69	·19	·09	7·41	
	1907	10,946	682	27	·09	·09	·64	·18	·55	2·56	·37	·09	7·49	
3rd (Lahore) ,, ...	1906	11,336	466	18	·26	...	·26	·62	·53	1·32	...	·09	5·38	
	1907	11,684	428	17	·09	...	·26	·68	·43	1·45	·17	...	6·25	
4th (Quetta) ,, ...	1906	7,513	791	25	·13	·13	·13	·27	·13	1·46	·87	·13	4·92	
	1907	7,964	599	24	...	·25	·25	·50	·25	3·64	·63	...	8·66	
5th (Mhow) ,, ...	1906	16,115	778	24	·43	·06	·50	·37	·25	1·99	·12	...	8·38	
	1907	16,434	665	22	·68	·06	·43	·18	·25	1·23	...	...	5·24	
6th (Poona) ,, ...	1906	9,538	575	20	1·47	·10	·10	·10	...	1·57	·21	·21	9·65	
	1907	9,375	583	20	·21	...	·32	·11	·11	1·07	...	·11	4·59	
7th (Meerut) ,, ...	1906	11,474	643	27	·35	...	·09	·44	1·22	1·22	...	...	6·36	
	1907	10,527	630	22	...	...	·47	·28	·57	1·33	·09	·09	5·98	
8th (Lucknow) ,, ...	1906	10,444	631	22	·57	·10	·29	·57	·57	1·34	·48	·10	7·56	
	1907	10,433	708	21	...	...	·19	·48	·29	1·05	·19	·10	5·08	
9th (Secunderabad) ,, ...	1906	10,603	524	20	2·26	...	·66	·28	·19	1·04	·19	·19	7·73	
	1907	10,306	370	16	·58	...	·78	...	·19	1·75	·19	·19	5·82	
Burma Division	1906	5,210	644	26	...	...	...	·38	·19	·19	...	·19	4·14	
	1907	5,096	650	26	...	...	...	...	·39	·39	...	·39	3·73	
Kohat, Derajat and Bannu Brigades	1906	8,540	1,231	36	...	...	·47	...	·35	2·69	...	...	5·85	
	1907	8,372	1,240	34	·36	·12	·60	·36	·24	5·26	·12	...	9·91	
Aden Brigade	1906	1,806	1,122	37	...	...	...	...	1·66	·55	·55	...	9·41	
	1907	1,509	861	29	...	...	...	...	2·65	1·99	1·33	...	7·29	
Army of India	1906	127,853	684	23	·48	·08	·27	·34	·52	1·56	·20	·09	6·53	8·58
	1907	126,392	629	22	·19	·04	·35	·26	·33	1·99	·20	·06	6·27	8·51

* Worked on the average annual strength of the troops present with *and absent from* their regiments during the year.

B.—GEOGRAPHICAL GROUPS.	Years.	Average strength.	RATIO PER MILLE OF STRENGTH. Admissions.	Constantly sick.	Admissions from: Influenza.	Cholera.	Small-pox.	Enteric fever.	Intermittent fever.	Remittent fever.	Simple continued fever.	Pneumonia.	Dysentery.	Venereal diseases.
Group I.—Burma Coast and Bay Islands.	1891-1900	1,891	794	37	2·7	·1	·2	...	195·2	6·6	4·3	5·0	66·4	55·5
	1906	1,349	485	18	...	...	·7	...	108·2	·7	71·9	3·0	5·2	8·2
	1907	1,297	563	22	...	...	...	...	154·2	11·6	57·8	·8	23·1	5·4
II.—Burma Inland ...	1891-1900	6,083	1,165	50	2·9	3·7	·1	·1	576·6	10·2	7·2	4·7	71·5	47·8
	1906	2,836	644	26	...	...	...	·4	222·5	1·1	40·2	2·1	15·5	16·6
	1907	2,807	629	26	...	...	...	·4	161·0	2·1	57·0	4·6	21·0	16·4
III.—Assam	1891-1900	2,003	1,209	51	9·2	3·0	·4	3·8	518·1	16·5	6·6	9·4	100·0	71·2
	1906	954	775	25	...	...	...	...	302·9	2·1	8·4	7·3	45·1	38·5
	1907	964	1,059	30	...	...	1·0	2·4	407·7	21·8	21·1	2·1	24·9	43·6
IV.—Bengal and Orissa ...	1891-1900	2,935	1,120	44	4·7	·4	·3	·2	541·9	15·0	6·2	5·9	86·1	35·6
	1906	1,816	876	33	2·2	·6	·6	1·7	303·4	6·1	20·4	5·5	43·5	30·8
	1907	2,022	907	33	1·5	...	·5	...	429·3	2·0	4·9	7·4	54·9	22·7
V.—Gangetic Plain and Chutia Nagpur.	1891-1900	6,463	668	28	7·8	1·6	·3	·3	215·4	12·5	2·8	7·6	42·3	33·7
	1906	6,209	564	18	10·0	·5	·2	·2	140·9	3·4	18·5	6·9	33·3	11·9
	1907	5,990	444	16	·2	...	·3	...	97·3	3·3	14·2	8·3	32·6	10·9
VI.—Upper Sub-Himalaya	1891-1900	15,166	732	29	2·9	1·0	·6	·2	280·8	17·9	3·1	15·0	29·8	33·7
	1906	20,842	600	22	3·3	·4	·4	1·3	227·7	4·8	14·9	10·3	28·3	15·8
	1907	20,904	582	20	4·9	·2	·5	2·6	218·7	4·8	19·9	11·6	18·8	14·4
VII.—North-Western Frontier, Indus Valley, and North-Western Rajputana.	1891-1900	15,459	1,102	36	8·9	2·3	·6	·2	507·5	22·2	10·3	29·4	56·5	22·5
	1906	19,224	936	27	16·2	·2	·5	1·2	468·3	7·3	17·0	10·0	49·2	8·5
	1907	18,024	951	28	12·9	·2	·1	1·4	433·3	7·7	2·2	23·0	44·9	7·5
VIII.—South-Eastern Rajputana, Central India and Gujarat.	1891-1900	12,670	814	27	6·0	1·6	·7	·1	337·5	11·3	12·3	13·1	29·9	41·5
	1906	13,243	767	23	3·2	·7	1·8	·9	355·3	3·9	13·4	10·4	40·7	14·6
	1907	13,094	656	21	3·7	·1	·3	·9	253·1	2·6	7·9	10·9	26·0	14·4
IX.—Deccan	1891-1900	19,594	736	27	7·0	1·9	1·3	·1	292·6	11·2	11·6	9·2	31·3	43·0
	1906	16,591	579	21	3·7	3·8	1·1	2·0	110·9	3·3	43·6	8·3	39·2	26·3
	1907	16,794	492	19	3·6	1·2	·7	2·4	78·1	1·1	37·5	6·5	32·7	23·2
X.—Western Coast ...	1891-1900	3,058	714	29	2·2	·3	·5	·4	158·9	14·9	26·8	6·2	60·5	53·3
	1906	1,783	804	25	...	...	·6	...	260·8	1·1	4·5	5·6	101·0	11·8
	1907	1,652	930	31	...	...	...	2·4	249·4	·6	2·4	10·9	73·2	24·8
XI.—Southern India ...	1891-1900	8,244	565	29	3·5	2·5	·6	·1	132·0	3·6	21·7	7·9	20·1	43·2
	1906	4,282	605	20	2·8	·7	1·6	1·4	166·0	4·6	37·8	6·1	42·7	23·8
	1907	3,880	415	16	·5	1·5	1·5	1·0	57·7	1·0	22·1	7·0	18·3	28·6
XII.—Hill Stations ...	1891-1900	17,027	1,078	40	21·3	1·0	·3	·6	170·0	24·6	8·4	20·5	53·3	49·6
	1906	22,403	735	28	3·8	...	·2	·8	250·0	6·5	66·2	12·8	33·6	20·2
	1907	22,710	634	25	14·3	...	·4	1·7	217·8	5·9	14·9	16·8	37·2	13·0
Army of India ...	1891-1900	127,666	852	32	8·1	1·8	·5	·3	343·8	15·2	9·1	14·4	48·8	37·2
	1906	127,853	684	23	5·2	·8	·6	1·0	261·8	5·0	29·6	9·0	37·1	16·2
	1907	126,392	629	22	6·5	·3	·4	1·4	220·5	4·5	16·6	12·4	33·5	14·7

* The decennial ratios are, of course, worked on the total strength of the ten years period.

NATIVE TROOPS.

TABLE XI.—RATIOS OF ARMIES.

	Ratio per 1,000 of the average strength.		
	Northern Army.	Southern Army.	Army of India.
I.—AVERAGE ANNUAL STRENGTH	61,163	50,484	126,392
II.—CONSTANTLY SICK RATE OF EACH MONTH—			
January	22·1	24·7	23·8
February	23·5	20·3	20·5
March	18·6	19·6	18·4
April	17·9	17·6	16·7
May	20·1	18·2	18·8
June	21·5	19·2	20·4
July	20·8	19·9	20·2
August	21·9	21·4	21·2
September	25·6	23·2	23·7
October	28·4	23·1	25·3
November	29·5	22·4	25·2
December	29·3	21·1	24·2
OF THE YEAR	24·1	21·2	21·7
III.—ADMISSION RATE OF THE YEAR—			
Influenza	5·6	8·5	6·5
Cholera	·1	·5	·3
Small-pox	·3	·5	·4
Enteric Fever	1·8	1·4	1·4
Intermittent Fever	287·9	159·8	220·5
Remittent Fever	6·6	2·6	4·8
Simple Continued Fever	13·9	23·5	16·5
Tubercle of the lungs	2·7	1·9	2·5
Pneumonia	15·4	9·5	12·4
Other Respiratory Diseases	28·9	23·6	26·5
Dysentery	31·3	33·3	33·5
Diarrhœa	5·8	7·2	6·8
Hepatic { Abscess	·1	·1	·1
Hepatic { Congestion and Inflammation	·5	·5	·5
Scurvy	1·6	3·0	2·3
Venereal Diseases	13·8	18·3	14·7
ALL CAUSES	512·0	583·7	628·9
IV.—DEATH RATE OF THE YEAR—			
Cholera	·98	·38	·19
Small-pox	·03	·06	·04
Enteric Fever	·39	·40	·35
Intermittent Fever	·56	·30	·40
Remittent Fever	·38	·16	·26
Simple Continued Fever	·02	·02	·02
Circulatory Diseases	·18	·24	·18
Tubercle of the lungs	·38	·30	·33
Pneumonia	2·62	1·84	2·99
Other Respiratory Diseases	·23	·22	·20
Dysentery	·20	·18	·20
Diarrhœa	·02	.....	·02
Hepatic Abscess	·05	·10	·06
Anæmia and Debility	·05	·10	·09
ALL CAUSES	7·28	5·68	6·27
V.—PERCENTAGE IN 100 ADMISSIONS—			
Influenza	·79	1·46	1·03
Cholera	·02	·09	·04
Small-pox	·05	·09	·06
Enteric Fever	·25	·24	·28
Intermittent Fever	40·43	27·38	35·06
Remittent Fever	·85	·44	·71
Simple Continued Fever	1·82	4·02	2·63
Tubercle of the lungs	·38	·32	·41
Pneumonia	2·16	1·63	1·97
Other Respiratory Diseases	4·06	4·04	4·21
Dysentery	4·39	6·04	5·33
Diarrhœa	·74	1·23	1·08
Hepatic { Abscess	·01	·02	·01
Hepatic { Congestion and Inflammation	·07	·09	·08
Scurvy	·14	·51	·36
Venereal Diseases	1·80	3·13	2·35
VI.—PERCENTAGE IN 100 DEATHS—			
Cholera	1·4	6·6	3·0
Small-pox	·4	1·0	·6
Enteric Fever	5·4	7·0	5·5
Intermittent Fever	7·8	5·2	6·3
Remittent Fever	5·2	2·8	4·2
Simple Continued Fever	·3	·3	·3
Circulatory Diseases	2·5	4·2	3·2
Tubercle of the lungs	5·2	5·2	5·1
Pneumonia	36·0	28·9	31·8
Other Respiratory Diseases	3·1	3·8	3·2
Dysentery	2·7	3·1	3·2
Diarrhœa	·2	.....	·3
Hepatic Abscess	·7	1·7	1·0
Anæmia and Debility	·7	1·7	1·5

TABLE XII.—RATIOS OF GEOGRAPHICAL GROUPS.

	RATIO PER 1,000 OF THE AVERAGE STRENGTH.											
	I. Burma Coast and Bay Islands.	II. Burma Inland.	III. Assam.	IV. Bengal and Orissa.	V. Gangetic Plain and Chutia Nagpur.	VI. Upper Sub-Himalaya.	VII. N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII. S.-E. Rajputana, Central India, and Gujarat.	IX. Deccan.	X. Western Coast.	XI. Southern India.	XII. Hill Stations.	Army of India.*
I.—AVERAGE ANNUAL STRENGTH ...	1,297	2,807	964	2,022	5,990	20,904	18,024	13,994	16,794	1,652	3,880	22,710	126,392
II.—CONSTANTLY-SICK-RATE OF EACH MONTH—													
January ...	13·5	24·4	37·4	29·5	22·9	23·6	37·3	25·5	21·5	36·2	25·7	34·3	23·8
February ...	16·4	20·6	33·0	33·9	16·5	16·7	29·2	19·2	18·1	30·7	17·1	26·4	20·5
March ...	23·4	17·4	21·9	32·7	13·7	14·2	21·8	16·7	18·8	28·7	15·6	22·0	18·4
April ...	25·5	22·8	25·8	20·8	13·9	13·9	19·7	16·3	16·0	26·9	13·0	18·2	16·9
May ...	25·7	23·4	33·8	18·6	14·5	19·1	21·1	15·8	17·2	30·3	12·6	20·6	18·8
June ...	28·3	35·6	32·7	20·5	15·6	19·4	23·1	16·8	17·4	23·1	13·6	22·4	20·2
July ...	24·5	36·6	26·9	30·8	14·7	18·5	22·3	18·3	16·9	27·5	11·9	22·7	20·2
August ...	24·3	34·7	24·3	38·4	15·2	20·3	22·0	20·1	18·8	39·1	12·0	24·3	21·2
September	19·1	26·2	24·4	43·5	14·3	25·5	27·7	25·3	20·2	29·6	12·4	26·8	23·7
October...	18·9	25·4	31·7	41·4	19·6	24·4	34·5	25·0	19·6	26·3	14·3	29·8	25·3
November	20·0	26·2	31·0	43·4	18·8	25·9	35·2	23·3	19·5	32·5	18·0	28·0	25·2
December	20·3	22·2	28·0	35·9	15·5	25·2	40·6	23·1	17·4	33·6	21·2	25·0	24·2
OF THE YEAR ...	21·6	26·4	30·1	32·6	16·2	20·5	28·1	20·8	18·6	30·9	16·0	25·1	21·7
III.—ADMISSION RATE OF THE YEAR—													
Influenza ...	...	...	...	1·5	·2	4·9	12·9	3·7	3·6	...	·5	14·3	6·5
Cholera ...	...	...	...	...	...	·2	·2	·1	1·2	...	1·5	...	·3
Small-pox ...	...	...	1·0	·5	·3	·5	·1	·3	·7	...	1·5	·4	·4
Enteric Fever ...	...	·4	2·1	...	...	2·6	1·4	·3	2·4	2·4	1·0	1·7	1·4
Intermittent Fever ...	154·2	161·0	407·7	499·3	97·3	218·7	433·3	253·1	78·1	249·4	57·7	217·8	220·5
Remittent Fever ...	11·6	2·1	21·8	2·0	3·3	4·8	7·7	2·6	1·1	·6	1·0	5·9	4·5
Simple Continued Fever	57·8	57·0	2·1	4·9	14·2	19·9	2·2	7·9	37·5	2·4	29·1	14·9	16·6
Tubercle of the lungs ...	2·3	1·8	1·0	·5	2·5	2·6	3·1	2·4	·8	7·9	1·3	2·3	2·5
Pneumonia ...	·8	4·6	2·1	7·4	8·3	11·6	23·0	10·9	6·5	10·9	7·0	16·8	12·4
Other Respiratory Diseases ...	29·3	27·4	75·7	36·6	16·7	20·2	37·9	17·6	24·2	47·2	13·4	20·4	26·5
Dysentery ...	23·1	21·0	24·9	54·9	32·6	18·8	44·9	26·0	32·7	73·2	48·3	37·2	33·5
Diarrhœa ...	5·4	3·2	24·9	6·9	3·0	2·4	8·5	6·3	4·3	32·7	4·1	6·3	6·8
Hepatic { Abscess ...	...	·4	...	...	...	·1	·1	...	·1	·6	·3	·0	·1
Hepatic { Congestion and Inflammation ...	·8	·4	...	2·0	·3	·8	·2	·5	·8	...	·3	·4	·5
Scurvy ...	...	·4	2·1	4·0	·7	·8	1·8	2·8	·7	15·1	1·3	2·3	2·3
Venereal Diseases ...	5·4	16·4	45·6	22·7	10·9	14·4	7·5	14·4	23·2	24·8	28·6	13·0	14·7
ALL CAUSES.	562·8	628·8	1059·1	907·0	443·9	582·3	951·1	655·6	491·8	929·8	414·9	634·2	628·9
IV.—DEATH RATE OF THE YEAR—													
Cholera ...	...	...	...	...	...	·10	·17	...	·83	...	1·29	...	·19
Small-pox ...	...	...	...	...	...	·05	·06	...	·06	...	...	·09	·04
Enteric Fever ...	...	...	1·04	·49	...	·33	·33	·16	·54	·61	·52	·48	·35
Intermittent Fever ...	...	·71	...	1·00	·33	·30	·15	·18	·51	·26	·79	·40	
Remittent Fever ...	...	...	...	·49	·33	·29	·22	·08	·18	...	·62	·26	
Simple Continued Fever	...	...	...	·49	...	...	...	...	·06	...	...	...	·02
Circulatory Diseases ...	...	...	...	...	...	·24	·17	...	·42	1·21	·52	·18	·18
Tubercle of the lungs ...	...	...	...	...	·33	·38	·22	·31	...	·61	·52	·57	·33
Pneumonia ...	·77	·71	...	·99	1·34	1·77	4·22	1·37	1·19	2·42	1·63	2·99	1·99
Other Respiratory Diseases ...	·77	·36	...	...	...	·19	·39	·31	·06	·61	...	·26	·20
Dysentery ...	...	...	...	...	·33	·24	·17	...	·12	...	...	·31	·20
Diarrhœa ...	...	...	...	...	...	...	...	...	...	...	...	·04	·02
Hepatic Abscess ...	·77	·36	...	...	...	·10	...	...	·12	...	·26	·04	·06
Anæmia and Debility ...	...	...	...	...	...	·05	·06	·08	·06	...	...	·13	·09
ALL CAUSES ...	2·31	3·21	1·04	4·95	5·68	6·46	8·77	4·38	5·06	7·87	5·93	8·37	6·27
V.—PERCENTAGE IN 100 ADMISSIONS—													
Influenza ...	...	...	...	·16	·04	·84	1·35	·56	·73	...	·12	2·26	1·03
Cholera ...	...	...	...	...	...	·03	·02	·01	·24	...	·37	...	·04
Small-pox ...	...	...	·10	·05	·08	·09	·01	·05	·13	...	·37	·06	·06
Enteric Fever ...	...	·06	·20	...	...	·44	·43	·14	·48	·26	·25	·26	·23
Intermittent Fever ...	27·40	25·61	38·49	47·33	21·93	37·55	45·55	38·60	15·87	26·82	13·91	34·35	35·06
Remittent Fever ...	2·05	·34	2·06	·22	·75	·83	·81	·40	·23	·07	·25	·93	·72
Simple Continued Fever	10·27	9·07	·20	·55	3·20	3·41	·23	1·21	7·62	·26	7·02	2·15	2·63
Tubercle of the lungs ...	·41	·28	·10	·05	·36	·48	·32	·36	·16	·85	·31	·36	·41
Pneumonia ...	·14	·74	·20	·82	1·88	1·99	2·14	1·67	1·33	1·17	1·68	2·65	1·97
Other Respiratory Diseases ...	5·21	4·36	7·15	4·03	3·76	3·47	3·98	2·69	3·98	5·08	3·23	3·63	4·21
Dysentery ...	4·11	3·34	2·35	6·05	7·33	3·23	4·72	3·97	6·65	7·38	4·41	5·80	5·33
Diarrhœa ...	·96	·51	2·35	·76	·68	·42	·89	·97	·87	3·52	·99	·99	1·08
Hepatic { Abscess ...	...	·06	...	...	...	·02	·01	...	·02	·07	·06	·01	·01
Hepatic { Congestion and Inflammation ...	·14	·06	...	·22	·08	·13	·02	·08	·17	...	·06	·06	·08
Scurvy ...	...	·06	·20	·44	·15	·13	·17	·43	·15	1·63	·31	·36	·36
Venereal Diseases ...	·96	2·61	4·31	2·51	2·44	2·47	·79	2·20	4·72	2·67	6·89	2·05	2·35
VI.—PERCENTAGE IN 100 DEATHS—													
Cholera ...	...	...	...	...	...	1·5	1·9	...	16·5	...	21·7	...	3·0
Small-pox ...	...	...	...	...	...	·7	·6	...	1·2	...	...	1·1	·6
Enteric Fever ...	...	...	100·0	10·0	...	3·2	3·8	10·0	10·6	7·7	8·7	5·8	5·5
Intermittent Fever ...	...	22·2	...	...	17·6	5·2	5·7	3·3	3·5	7·7	4·3	9·5	6·3
Remittent Fever ...	...	...	...	18·0	5·9	4·4	2·5	1·7	3·5	...	...	7·4	4·3
Simple Continued Fever	...	...	...	10·0	...	...	...	...	1·2	...	...	...	·3
Circulatory Diseases ...	...	...	...	...	...	3·7	1·9	...	8·2	15·4	8·7	2·1	3·2
Tubercle of the lungs ...	...	...	...	...	5·9	5·9	2·5	6·7	...	7·7	8·7	6·8	5·3
Pneumonia ...	33·3	22·2	...	20·0	23·5	27·4	48·1	30·0	23·5	30·8	17·4	33·8	31·8
Other Respiratory Diseases	33·3	11·1	...	...	...	3·0	4·4	6·7	1·2	7·7	...	3·2	3·2
Dysentery ...	...	...	...	...	5·9	3·7	1·9	...	2·4	...	...	3·7	3·2
Diarrhœa ...	...	...	...	...	...	...	...	...	...	...	...	·5	·3
Hepatic Abscess ...	...	...	...	...	...	1·5	...	...	2·4	...	4·3	·5	1·9
Anæmia and Debility ...	...	...	...	...	...	·7	·6	1·7	1·2	...	...	1·6	1·5

* Including Group Extra India.

NATIVE TROOPS.

TABLE XIII—SICKNESS AND MORTALITY IN PLAINS AND HILLS—(1—ACTUALS 2.—RATIOS

C. Plains and Hills.	Average annual strength.	Intermittent Fever.		Remittent Fever.		Tubercle of the lungs.		Pneumonia.		Other Respiratory Diseases.		Dysentery and Diarrhœa.		Scurvy.		Anæmia and Debility.		All Causes.		Average number constantly sick.
		A.	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	
1903. Plains ...	100,869	24,204	60	854	94	369	46	1,340	277	2,122	22	4,225	38	179	8	1,424	8	64,660	944	2,349
		240·0	·59	8·5	·93	3·7	·46	13·3	2·75	21·0	·22	41·9	·38	1·8	·08	10·1	·08	641·0	9·36	23·3
Hills ...	21,676	5,898	16	229	16	350	38	448	202	611	4	1,156	11	120	11	328	5	16,466	238	733
		272·1	·74	10·1	·74	16·1	1·61	20·7	4·71	28·2	·18	53·3	·51	5·5	·51	15·1	·23	759·6	13·06	33·8
Hills above 5,000 feet sea-level.	9,900	1,455	4	105	3	50	18	137	16	213	1	357	4	20	...	99	1	5,673	82	255
		147·0	·40	10·6	·30	5·1	1·82	13·8	1·62	21·5	·10	36·1	·40	2·0	...	10·0	·10	573·0	8·28	25·8
Hills below 5,000 feet sea-level.	11,776	4,443	12	124	13	300	17	311	86	398	3	799	7	100	11	229	4	10,793	201	478
		377·3	1·02	9·7	1·10	25·5	1·44	26·4	7·30	33·8	·25	67·8	·59	8·5	·93	19·4	·34	916·5	17·07	40·6
1904. Plains ...	98,289	17,182	32	605	53	340	25	1,048	190	1,924	23	3476	20	324	1	1,283	12	56,256	692	2,151
		174·8	·33	6·2	·54	3·5	·25	10·7	1·93	19·6	·23	35·4	·20	3·3	·01	13·1	·12	572·6	7·04	21·9
Hills ...	20,366	4,590	10	226	20	125	30	318	50	426	4	702	8	83	1	232	...	13,397	180	576
		225·4	·49	11·1	·98	6·1	1·47	15·6	2·46	20·9	·20	34·5	·39	4·1	·05	12·4	...	656·8	8·84	28·3
Hills above 5,000 feet sea-level.	8,576	1,438	7	85	7	49	12	103	13	165	3	269	1	35	1	81	...	5,055	72	227
		157·7	·82	9·9	·82	5·7	1·40	12·0	1·52	19·2	·35	31·4	·12	4·1	·12	9·4	...	589·4	8·40	26·5
Hills below 5,000 feet sea-level.	11,790	3,152	3	141	13	76	18	215	37	261	1	433	7	48	...	151	...	8,342	108	349
		267·3	·25	9·7	1·20	6·4	1·53	18·2	3·14	22·1	·08	36·7	·59	4·1	...	14·5	...	705·9	9·16	29·6
1905. Plains ...	99,771	14,461	28	669	41	287	33	1,266	185	2,528	23	3,771	18	124	3	1,080	9	55 250	602	2,083
		144·9	·28	6·7	·41	2·9	·33	12·7	1·86	25·3	·21	37·8	·18	1·2	·03	10·8	·09	553·8	6·03	20·9
Hills ...	20,224	3444	9	233	17	93	26	277	50	920	5	850	9	84	1	253	...	14,749	365	624
		170·3	·45	11·5	·84	4·6	1·29	13·7	2·37	45·5	·35	42·0	·45	4·2	·05	12·5	...	729·3	18·05	30·9
Hills above 5,000 feet sea-level.	9,583	1,297	4	60	7	46	13	95	20	333	2	341	6	50	1	100	...	5,698	260	266
		135·3	·42	6·3	·73	4·8	1·36	9·9	2·09	34·7	·21	35·6	·63	5·2	·10	10·4	...	594·6	27·13	27·7
Hills below 5,000 feet sea-level.	10,641	2,147	5	173	10	47	13	182	30	587	3	509	3	34	...	153	...	9,051	105	364
		201·8	·47	16·3	·94	4·4	1·22	17·1	2·63	55·2	·47	47·8	·28	3·2	...	14·4	...	850·6	9·87	34·2
1906. Plains ...	101,783	26,348	31	485	33	221	32	856	159	2,108	14	4656	27	214	10	1,349	3	68,275	665	2,201
		258·9	·30	4·8	·32	2·2	·31	8·4	1·56	20·7	·14	45·7	·27	2·1	·10	13·2	·03	670·8	6·53	21·6
Hills ...	22,469	6,104	6	146	10	79	29	285	39	754	2	926	8	92	...	347	2	17,057	158	645
		271·7	·27	6·5	·44	3·5	1·29	12·7	1·74	33·6	·09	41·2	·36	4·1	...	15·4	·09	759·1	7·03	28·8
Hills above 5,000 feet sea-level.	11,510	2,474	2	72	6	34	9	118	17	289	2	437	7	70	...	163	2	6,923	78	293
		214·9	·17	6·3	·52	3·0	·78	10·3	1·48	25·1	·17	38·0	·61	6·1	...	14·2	·17	601·5	6·78	25·5
Hills below 5,000 feet sea-level.	10,959	3,630	4	74	4	45	20	162	22	465	...	489	1	22	...	184	...	10 134	80	353
		331·2	·36	6·8	·36	4·1	1·82	15·2	2·01	42·4	...	44·6	·09	2·0	...	16·8	...	924·7	7·30	32·2
1907. Plains ...	99,460	21,867	32	398	18	218	25	1,171	185	2,464	19	3802	17	223	14	1,168	6	61,973	582	2,047
		220·0	·32	4·1	·18	2·2	·25	11·8	1·86	24·8	·19	38·2	·17	2·2	·14	11·8	·06	623·2	5·85	20·6
Hills ...	22,399	5,023	18	132	14	52	13	379	66	660	6	982	8	54	2	338	3	14,442	187	568
		224·3	·80	5·9	·63	2·3	·58	16·9	2·95	29·5	·27	43·8	·36	2·4	·09	15·1	·13	643·4	8·35	25·4
Hills above 5,000 feet sea-level.	11,378	1,263	2	29	6	22	7	152	16	231	3	501	4	42	2	129	...	5,499		
		111·0	·18	2·5	·53	1·9	·62	13·4	1·41	20·3	·26	44·6	·35	3·7	·18	11·3	...	483·3		
Hills below 5,000 feet sea-level.	11,021	3,760	16	103	8	30	6	227	50	429	3	481	4	12	...	209	3	8,913		
		341·2	1·45	9·3	·73	2·7	·54	20·6	4·54	38·9	·27	43·6	·36	1·1	...	19·0	·27	808·7		

PRISONERS.

TABLE XIV.—SUMMARY, SICKNESS AND MORTALITY.

A.—Administrations.	Years.	Average strength.‡	RATIO PER MILLE OF STRENGTH.* Admissions.	Constantly sick.	Deaths from Cholera.	Small-pox.	Remittent fever.	Tubercle of the lungs.	Pneumonia.	Other respiratory diseases.	Dysentery.	Diarrhœa.	Anæmia and debility.	All causes.
Burma	1901-1905	11,779	452	22	·68	·02	·84	3·63	7·32	·51	2·27	·82	·22	16·38
	1906	13,309	280	16	·22	0·00	·67	4·19	1·20	·51	0·50	·45	·07	14·82
	1907	13,721	256	14	·22	...	·15	3·06	·80	·44	·73	·29	·22	11·88
Eastern Bengal and Assam...	1901-1905	6,485	1,099	45	·67	·10	·64	3·34	3·47	·76	7·67	1·05	1·46	28·09
	1906	6,671	913	43	1·80	...	·15	3·06	5·20	1·16	7·71	·58	·87	29·69
	1907	7,310	861	38	·96	·14	·27	3·97	3·87	·96	7·25	1·23	·68	29·55
Bengal	1901-1905	14,573	999	37	·77	·04	·29	3·80	2·48	·54	5·83	1·30	·56	23·83
	1906	14,857	1,009	33	1·01	·20	·47	4·31	3·95	·74	5·72	·88	·67	23·36
	1907	14,408	938	36	·35	·28	·14	3·12	3·64	·69	3·85	·35	·42	16·94
United Provinces of Agra and Oudh	1901-1905	25,557	699	34	·46	·04	·09	3·98	3·54	·94	3·13	1·06	·22	18·77
	1906	24,872	603	27	·44	·12	·04	3·85	3·77	·89	2·80	·76	·24	16·56
	1907	23,887	603	29	·04	·04	...	3·67	3·43	·96	1·93	1·05	·17	15·03
Punjab	1901-1905	12,333	999	32	·12	·10	·34	3·68	4·74	·66	3·61	·75	·68	21·68
	1906	11,744	737	26	...	...	...	3·83	3·64	·17	2·64	1·36	·85	15·75
	1907	11,154	707	30	...	...	·27	3·86	4·03	·54	2·06	2·34	·90	19·81
North-West Frontier Province	1901-1905	1,287	2,026	32	...	·38	·16	·93	4·35	·47	3·73	·47	·31	20·35
	1906	1,300	1,466	36	...	...	...	·77	3·85	1·54	4·08	·77	1·54	24·38
	1907	1,183	1,690	35	...	...	...	3·38	5·92	...	3·38	·85	...	17·75
Central Provinces	1901-1905	4,490	772	25	·09	...	·05	2·83	2·28	1·31	3·61	1·85	2·19	20·89
	1906	3,329	598	19	...	...	·60	2·80	1·20	·30	2·10	·30	·60	13·80
	1907	3,241	526	18	...	...	·93	2·47	·93	·62	4·32	·62	·93	19·44
Bombay	1901-1905	8,725	680	29	·05	1·16	·80	3·32	6·56	1·60	1·74	1·63	·83	30·36
	1906	7,925	689	31	2·27	...	·88	1·89	3·66	4·14	3·66	·76	·88	20·68
	1907	7,537	693	32	...	...	...	2·52	5·84	1·46	1·85	1·59	·93	20·96
Madras	1901-1905	9,832	482	31	1·36	·02	·14	3·50	1·85	·33	2·36	1·18	·37	18·74
	1906	10,426	417	18	4·32	1·10	·10	3·49	1·63	·58	4·32	·10	·38	21·77
	1907	10,166	376	19	3·84	...	·29	2·46	1·87	·26	2·85	·10	·30	18·79
INDIA†	1901-1905	95,479	759	31	·54	·06	·28	3·32	3·07	·79	3·21	1·04	·56	22·72
	1906	93,394	668	27	1·18	·48	·21	3·31	3·55	·71	3·25	·73	·55	19·27
	1907	93,264	624	27	·59	·06	·15	2·74	3·90	·73	2·57	·80	·45	17·72
ANDAMANS	1901-1905	13,289	1,838	61	...	...	2·59	7·66	4·23	1·28	10·84	1·57	·08	37·38
	1906	14,688	2,041	70	...	...	2·52	5·58	5·38	1·23	4·90	·34	...	27·36
	1907	14,411	1,903	78	·07	...	·56	5·20	4·30	·90	3·12	·69	...	25·50
INDIA¶	1901-1905	108,769	891	35	·47	·06	·56	3·85	3·21	·85	4·58	1·11	·49	23·11
	1906	110,082	843	33	·95	·08	·52	3·52	3·93	·78	3·47	·88	·47	20·34
	1907	107,675	·795	34	·52	·06	·20	3·07	3·08	·75	2·65	·79	·39	18·51

* Excluding Subsidiary Jails. † Including Ajmer, Sibi, Quetta, Mercara and Secunderabad and excluding Andamans. ¶ Including Andamans.

B.—Geographical Groups.	Years.	Average strength.‡	RATIO PER MILLE OF STRENGTH.* Admissions.	Constantly sick.	Admissions from Influenza.	Cholera.	Small-pox.	Enteric fever.	Intermittent fevers.	Remittent fever.	Simple continued fever.	Pneumonia.	Dysentery.
Group I.—Burma Coast and Bay Islands	1901-1905	7,069	442	21	·72	1·21	·21	·16	99·24	2·18	30·72	3·18	37·70
	1906	9,576	248	15	4·06	·16	1·10	·14	43·10	·16	18·12	3·17	10·17
	1907	9,738	248	14	·28	·15	·21	...	35·15	·14	19·12	1·13	10·16
,, II.—Burma Inland	1901-1905	3,812	471	23	4·21	1·18	·21	·16	107·79	2·15	37·0	8·0	67·39
	1906	3,793	360	19	...	·58	·13	·13	69·11	·13	9·11	5·5	37·2
	1907	3,963	274	21	...	1·13	·39	·13	38·18	·16	9·3	4·5	43·11
,, III.—Assam	1901-1905	1,439	820	42	19·3	1·15	1·11	·21	258·3	5·6	4·4	4·8	234·12
	1906	1,430	757	39	·7	4·19	...	...	260·1	7·0	...	7·7	160·1
	1907	1,345	886	28	89·3	...	...	·16	230·9	1·9	...	3·2	123·8
,, IV.—Bengal and Orissa	1901-1905	13,182	2,002	40	21·4	2·1	·5	·5	270·3	2·1	10·8	10·3	258·9
	1906	13,457	987	44	9·8	1·16	·6	1·3	273·6	3·0	1·0	9·6	223·8
	1907	12,670	946	41	10·0	1·4	·9	·2	302·8	2·6	1·7	11·0	191·2
,, V.—Gangetic Plain and Chotia Nagpur...	1901-1905	23,686	769	33	10·0	·9	·4	·4	265·3	1·2	4·5	10·0	86·0
	1906	23,176	588	32	4·6	2·1	·9	·9	231·6	·4	11·2	9·6	85·5
	1907	22,646	620	36	2·0	1·4	1·9	·2	203·7	·3	6·0	9·8	64·9
,, VI.—Upper Sub-Himalaya ...	1901-1905	13,001	946	32	17·8	·2	·3	·8	409·2	4·3	3·9	17·5	56·3
	1906	12,351	818	30	13·5	...	2·0	·3	358·9	·7	7·2	12·4	36·4
	1907	11,880	752	31	7·2	·1	·6	1·0	390·5	·4	3·1	21·4	34·3
,, VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1901-1905	8,142	988	29	6·8	·3	1·2	·2	291·2	1·3	1·1	22·4	48·5
	1906	8,447	690	26	6·0	...	...	·1	277·0	·6	4·0	18·1	37·5
	1907	7,958	768	31	1·0	...	...	·1	231·7	·6	1·5	31·7	52·5
,, VIII.—South-Western Rajputana, Central India and Gujarat.	1901-1905	4,772	854	39	14·3	·5	·8	·1	278·4	·6	·3	20·8	36·5
	1906	4,585	618	39	13·5	...	4·0	·2	194·6	·2	...	13·9	23·7
	1907	4,206	664	34	...	...	...	...	162·6	·2	...	18·3	19·0
,, IX.—Deccan	1901-1905	8,373	812	31	14·9	·1	·3	·2	284·4	6·0	4·5	9·9	50·3
	1906	6,810	780	29	7·3	1·5	·4	·4	189·2	1·8	2·6	5·6	59·5
	1907	6,563	737	29	5·2	·2	·2	·6	213·9	1·8	·6	3·7	43·8
,, X.—Western Coast	1901-1905	2,718	537	23	1·4	·2	1·0	3·7	355·2	4·7	8·3	9·5	40·3
	1906	2,453	500	22	...	14·7	·8	15·9	199·3	7·7	11·4	13·1	88·9
	1907	2,290	472	23	·4	...	...	11·4	95·6	1·3	5·2	7·0	75·1
,, XI.—Southern India	1901-1905	8,845	497	32	4·6	2·6	·2	·7	106·5	1·2	26·8	9·6	55·1
	1906	9,429	419	28	1·9	7·3	1·2	4·3	57·6	2·1	30·5	7·4	76·0
	1907	9,166	376	29	...	11·6	·3	·5	55·2	·7	8·2	4·9	51·3
,, XII.—Hills	1901-1905	594	813	26	5·9	1·3	1·0	2·4	266·3	3·7	19·9	20·2	85·5
	1906	522	894	31	...	22·7	3·5	8·7	237·8	17·5	13·2	31·5	80·4
	1907	648	931	25	...	...	1·6	4·6	184·6	26·0	3·8	11·5	65·8
INDIA†	1901-1905	95,479	759	31	10·7	1·0	·5	·6	254·9	2·1	8·1	13·4	88·3
	1906	95,394	668	27	5·9	1·0	1·0	1·1	207·2	1·5	9·7	10·1	78·9
	1907	93,264	628	27	4·9	1·5	·7	·7	190·2	1·1	5·1	11·5	67·9
ANDAMANS	1901-1905	13,289	1,838	61	5·6	...	...	...	1181·3	20·2	...	11·8	256·9
	1906	14,688	2,041	70	26·2	...	...	...	1450·0	4·4	5·4	15·8	94·0
	1907	14,411	1,903	78	1·1	·1	...	...	1318·6	1·0	22·6	13·9	100·8
INDIA‡	1901-1905	108,769	891	35	12·0	·9		·5	356·9	3·1	7·1	13·5	96·7
	1906	110,082	845	32	8·6	1·7		·9	373·0	1·9	9·2	10·9	80·9
	1907	107,675	795	34	4·4	1·3		·6	341·2	1·3	7·5	11·6	73·5

* Excluding Subsidiary Jails. † Including Aden and excluding Andamans. ‡ The quinquennial ratios are, of course, worked on the total strength of the five years.

PRISONERS.

TABLE XV—RATIOS OF ADMINISTRATIONS.

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.										
	Burma.	Eastern Bengal and Assam.	Bengal.	United Provinces.	Punjab.	N.-W.F. Province.	Central Provinces.	Bombay.	Madras.	India.*	Andamans.	India.†
I.—AVERAGE ANNUAL STRENGTH ...	13,721	7,318	14,408	23,887	11,154	1,183	3,248	7,537	10,166	93,264	14,412	107,675
II.—CONSTANTLY SICK RATE OF EACH MONTH—												
January	13·8	39·8	34·4	26·1	32·1	29·9	15·0	37·9	20·7	27·3	67·6	32·8
February	14·6	39·0	33·7	24·4	31·9	29·2	13·3	33·6	19·4	26·2	68·6	32·0
March	14·3	38·0	33·2	25·0	31·1	27·7	12·5	33·5	17·2	25·8	72·1	32·2
April	14·9	31·8	34·7	25·6	28·8	29·5	13·5	29·9	15·8	25·1	74·7	32·0
May	12·3	33·6	36·1	25·7	30·1	30·9	16·3	27·2	21·5	25·9	76·0	32·8
June	12·5	36·6	35·0	26·6	31·8	35·5	15·9	27·8	16·6	26·0	85·3	34·0
July	14·6	38·9	35·8	27·8	30·9	41·3	15·1	27·3	17·0	26·8	84·4	34·5
August	14·0	39·7	38·0	30·0	30·0	42·9	21·6	31·1	19·0	28·4	79·2	34·8
September	14·1	39·4	37·5	33·4	30·1	36·6	26·1	32·3	18·6	29·3	80·2	36·0
October	14·3	39·1	36·4	31·4	28·8	42·1	27·3	35·8	18·9	28·8	80·9	35·6
November	13·9	39·8	35·0	31·4	28·4	39·0	22·6	35·4	18·3	28·2	82·4	35·3
December	12·7	34·3	36·9	33·0	29·8	32·9	17·9	31·1	21·4	28·8	85·4	36·1
OF THE YEAR ...	13·8	37·5	35·6	28·6	30·3	35·0	18·1	31·9	18·7	27·3	77·9	34·0
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	35·3	34·2	...	30·2	35·0	18·0	28·7	17·9	26·5	...	33·1
III.—ADMISSION RATE OF THE YEAR—												
Influenza	·6	36·0	·2	4·6	2·3	6·8	10·2	·3	...	4·9	1·1	4·4
Cholera	·4	2·2	·6	·1	...	...	...	·2	10·4	1·5	·1	1·3
Small-pox	·1	1·0	2·0	1·0	·2	...	·3	...	·1	·7	...	·6
Enteric Fever	·1	·4	·1	·2	1·1	2·5	·9	·7	3·0	·7	...	·6
Intermittent Fever	36·4	253·5	34·7	199·8	231·5	430·3	152·1	177·5	57·2	190·2	1,318·6	341·2
Remittent Fever	·5	1·4	2·0	1·2	·5	...	3·4	·3	·7	1·1	1·0	1·1
Simple Continued Fever	13·9	...	1·8	5·5	2·5	...	·3	1·7	8·7	5·1	22·6	7·5
Tubercle of the lungs	4·9	10·4	12·5	5·4	10·6	8·5	4·0	5·8	6·5	7·5	8·2	7·6
Pneumonia	2·3	·7·3	10·5	15·6	19·3	24·5	5·9	19·8	4·8	11·5	13·9	11·8
Other Respiratory Diseases ...	7·1	21·3	34·3	22·9	51·6	44·0	19·7	52·5	17·0	27·5	54·3	131·1
Dysentery	20·0	215·3	143·2	36·5	33·2	87·9	33·0	44·8	57·2	67·9	109·8	73·5
Diarrhœa	7·1	75·6	71·9	23·4	34·0	103·1	29·9	37·0	6·0	34·4	31·2	34·0
Spleen Diseases	·1	...	·6	1·0	·1	4·2	...	4·5	...	8·8	·3	·7
Scurvy	·4	·3	·6	·2	·6	...	2·2	3·8	...	·7	4·2	1·1
Anæmia and Debility	2·3	21·8	12·6	10·6	15·2	13·5	13·3	11·3	9·9	11·2	...	9·7
Abscess, Ulcer and Boil ...	50·2	37·6	58·4	92·8	103·6	244·3	59·9	79·7	24·5	70·5	87·8	72·8
ALL CAUSES ...	255·5	850·5	938·2	602·9	706·8	1,208·8	525·8	693·0	375·6	623·8	1,902·7	795·0
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	837·1	922·0	...	707·6	1,264·1	523·5	667·8	456·9	628·4	...	790·8
IV.—DEATH RATE OF THE YEAR—												
Cholera	·22	·96	·35	·04	...	...	...	...	3·84	·39	·07	·52
Small-pox	...	·14	·28	·04	...	...	...	...	...	·06	...	·06
Enteric Fever	·07	·41	·07	·08	·27	...	...	·13	·79	·20	...	·18
Intermittent Fever	·22	2·33	·90	·88	·45	...	·31	·53	·98	·79	1·67	·91
Remittent Fever	·15	·27	·14	...	·27	...	·93	...	·20	·15	·56	·20
Simple Continued Fever	...	...	...	...	...	...	...	...	...	...	·07	·01
Tubercle of the lungs	3·06	3·97	3·12	1·67	3·86	3·38	2·47	2·52	2·46	2·74	5·20	3·07
Pneumonia	·80	2·87	2·64	3·43	4·03	5·92	·93	5·84	1·87	2·90	4·30	3·08
Other Respiratory Diseases ...	·44	·96	·62	·96	·54	...	·62	1·46	·20	·73	·90	·75
Dysentery	·73	7·25	2·85	1·93	2·06	3·38	4·32	1·86	2·85	2·37	3·12	2·65
Diarrhœa	·29	1·23	·35	1·05	1·34	·85	·62	1·59	·10	·80	·69	·79
Hepatic Abscess	·22	·14	·07	·13	...	...	...	...	·10	·10	...	·08
Anæmia and Debility	·22	·68	·42	·17	·90	...	·93	·93	·30	·45	...	·39
Phagedæna, Slough and Gangrene	...	...	·07	·08	·09	...	...	...	...	·04	...	·04
ALL CAUSES ...	11·88	29·55	16·94	15·03	19·81	17·75	19·44	20·96	18·79	17·72	23·59	18·51
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	28·46	17·55	...	19·70	18·74	19·20	20·32	18·35	17·76	...	18·50
V.—PERCENTAGE IN 100 ADMISSIONS—												
Influenza	·23	4·18	·02	·77	·33	·56	1·94	·04	...	·78	·06	·55
Cholera	·14	·25	·07	·02	...	...	...	·02	2·78	·24	·00	·16
Small-pox	·06	·11	·21	·26	·03	...	·06	...	·03	·11	...	·08
Enteric Fever	·03	·05	·01	·03	·15	·21	·18	·10	·51	·11	...	·08
Intermittent Fever	14·26	29·70	36·74	38·15	32·75	35·59	29·81	25·62	15·24	30·49	69·30	42·93
Remittent Fever	·20	·16	·21	·19	·01	...	·65	·01	·18	·17	·05	·13
Simple Continued Fever	5·45	...	·10	·01	·36	...	·06	·25	2·30	·82	1·19	·96
Tubercle of the lungs	1·91	1·21	1·33	·89	1·50	·70	·76	·84	1·73	1·21	·43	·96
Pneumonia	·91	·84	1·12	2·58	2·73	2·03	1·12	2·85	1·28	1·85	·73	1·49
Other Respiratory Diseases ...	2·77	2·48	3·65	3·80	7·31	3·64	3·76	7·58	4·53	4·42	2·86	3·91
Dysentery	7·84	25·02	15·26	6·05	4·69	7·27	6·46	6·47	15·24	10·88	5·77	9·24
Diarrhœa	2·80	8·79	7·66	3·89	4·81	8·53	5·69	5·34	1·60	5·51	1·64	4·27
Spleen Diseases	·03	...	·07	·17	·01	·35	...	·65	...	·13	·02	·09
Scurvy	·14	·03	·07	·02	·09	...	·41	·56	...	·13	·22	·14
Anæmia and Debility	·94	2·51	1·35	1·76	2·14	1·12	2·52	1·63	2·65	1·80	...	1·22
Abscess, Ulcer and Boil ...	19·65	4·37	6·23	15·40	14·66	20·21	11·38	11·51	6·52	11·30	4·62	9·16
VI.—PERCENTAGE IN 100 DEATHS—												
Cholera	1·8	3·2	2·0	·3	...	...	...	...	20·4	3·3	·3	3·2
Small-pox	...	·5	1·6	·3	...	...	...	...	...	·4	...	·3
Enteric Fever	·6	1·4	·4	·6	1·4	...	...	·6	4·2	1·1	...	1·0
Intermittent Fever	1·8	7·9	5·3	5·8	2·3	...	1·6	2·5	5·2	4·5	7·1	4·9
Remittent Fever	1·2	·9	·8	...	1·4	...	4·8	...	1·0	·8	2·4	1·1
Simple Continued Fever	...	...	...	...	...	...	...	...	...	...	·3	·1
Tubercle of the lungs	25·8	13·4	18·4	11·1	19·5	10·0	12·7	12·6	13·1	15·6	22·1	16·8
Pneumonia	6·7	9·7	15·6	22·8	20·4	33·3	4·8	27·8	9·0	16·4	18·2	16·7
Other Respiratory Diseases ...	3·7	3·2	3·7	6·4	2·7	...	3·2	7·0	1·0	4·1	3·8	4·1
Dysentery	6·1	24·5	16·8	12·8	10·4	10·6	22·2	8·0	15·2	14·6	13·2	14·3
Diarrhœa	2·5	4·2	2·0	7·0	6·8	4·8	3·2	7·6	·5	4·5	2·9	4·3
Hepatic Abscess	1·8	·5	·4	·8	...	...	...	...	·5	·5	...	·5
Anæmia and Debility	1·8	2·3	2·5	1·1	4·5	...	4·8	4·4	1·0	2·5	...	2·1
Phagedæna, Slough and Gangrene	...	...	·4	·6	·5	...	...	...	...	·2	...	·2

* Including Ajmer, Sibi, Quetta, Secunderabad, Mercara, and excluding Andamans.
† Including " " " " " " Andamans.

TABLE XVI.—RATIOS OF GEOGRAPHICAL GROUPS.

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hills.	India.*
I.—AVERAGE ANNUAL STRENGTH ...	9,728	3,993	1,545	32,670	22,646	11,880	7,958	4,706	6,563	2,290	9,105	608	93,262
II.—CONSTANTLY SICK RATE OF EACH MONTH—													
January	13·5	14·6	24·8	42·7	23·6	33·3	33·0	31·8	26·8	28·4	21·4	25·4	27·3
February	13·9	16·5	25·7	41·8	22·7	30·5	33·4	30·3	24·1	21·8	20·1	25·5	26·2
March	13·2	17·0	31·6	40·0	23·0	30·3	31·5	30·3	24·6	25·2	17·7	26·0	25·8
April	13·8	17·8	22·9	35·7	24·9	30·0	28·1	31·1	24·7	20·5	16·6	22·7	23·1
May	12·3	12·4	26·6	37·3	25·0	31·2	28·7	32·6	23·4	20·4	22·4	23·2	25·9
June	12·2	13·2	29·1	40·5	24·2	31·4	31·0	31·2	26·4	16·3	16·7	28·3	26·0
July	15·0	13·5	27·1	43·8	25·1	29·2	32·1	34·1	24·1	26·5	16·3	26·9	26·8
August	14·3	13·5	27·5	43·0	28·0	30·8	30·8	38·2	32·4	26·1	18·4	23·6	28·4
September	14·8	12·5	33·2	41·2	30·3	34·3	30·3	41·2	33·8	22·1	18·7	26·3	29·3
October	14·8	13·1	30·3	41·3	29·2	31·6	31·6	35·3	38·6	21·7	18·7	25·9	28·8
November	14·8	11·9	25·7	43·5	27·4	30·8	32·9	36·9	34·3	18·9	18·4	28·4	28·2
December	13·2	11·7	21·8	42·2	30·9	33·0	31·4	37·8	28·6	22·0	21·3	25·0	28·8
OF THE YEAR ...	13·8	13·9	27·2	41·1	26·3	31·4	31·2	34·2	28·6	23·7	18·9	25·2	27·3
III.—ADMISSION RATE OF THE YEAR—													
Influenza	·8	...	89·3	10·0	2·0	7·7	1·0	...	5·2	·4	...	...	4·9
Cholera	·5	...	...	1·4	·4	·1	...	...	·2	...	11·6	...	1·5
Small-pox	·1	·3	...	·9	1·9	·6	...	...	·2	...	·1	...	·7
Enteric Fever	...	·3	·6	·2	·2	1·0	·9	...	·6	11·4	·5	1·6	·7
Intermittent Fever	35·5	38·8	326·9	302·8	203·7	296·5	231·7	162·6	213·9	93·6	55·2	182·6	190·2
Remittent Fever	·4	·8	1·9	2·6	·3	·4	·6	·2	1·8	1·3	·7	28·0	1·2
Simple Continued Fever ...	17·1	6·3	...	1·7	6·0	2·1	1·5	...	·6	5·2	8·2	3·3	5·1
Tubercle of the lungs	5·8	2·8	7·1	15·6	5·6	8·3	11·1	2·6	2·7	10·9	6·3	1·6	7·5
Pneumonia	1·3	4·8	5·2	11·0	9·8	21·4	31·7	18·3	3·7	7·0	4·6	11·5	11·5
Other Respiratory Diseases ...	7·0	7·3	11·7	32·3	22·4	38·3	64·7	38·0	23·2	36·7	16·5	34·5	27·5
Dysentery	10·6	43·1	173·5	191·2	64·9	34·3	52·5	19·0	46·6	75·1	51·3	65·8	67·9
Diarrhœa	6·6	8·5	53·7	85·9	30·6	27·1	46·9	35·0	38·7	40·2	3·5	41·1	34·4
Spleen Diseases	·1	...	...	·2	·8	·5	2·9	1·7	2·3	·4	...	...	·8
Scurvy	·5	...	1·3	·1	·4	·4	3·0	·5	2·0	·4	...	1·6	·7
Anæmia and Debility	1·7	3·8	15·5	16·9	12·5	15·4	11·4	8·8	10·8	14·4	9·2	13·2	11·2
Abscess, Ulcer and Boil ...	51·8	46·3	40·8	46·6	78·3	100·8	105·2	112·0	89·7	30·6	26·1	78·9	70·5
ALL CAUSES ...	248·0	273·7	866·0	946·3	620·3	1·5	737·5	663·6	726·5	478·6	375·5	671·1	623·8
IV.—DEATH RATE OF THE YEAR—													
Cholera	·31	...	...	·63	·22	...	...	...	...	...	4·28	...	·59
Small-pox	...	...	...	·24	·13	...	...	...	...	...	...	...	·06
Enteric Fever	...	·25	·65	·16	·09	·25	·25	...	...	3·06	·11	...	·20
Intermittent Fever	·21	·25	3·88	1·50	·75	·76	·63	·24	·46	·87	·88	1·64	·79
Remittent Fever	·10	·25	...	·24	...	·08	·25	...	·46	...	·22	1·64	·15
Simple Continued Fever ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tubercle of the lungs	4·32	...	2·59	4·26	1·94	2·44	4·15	·95	1·83	4·80	2·42	...	2·74
Pneumonia	·51	1·50	3·24	3·00	2·47	4·04	9·05	3·09	·76	3·49	1·54	...	2·90
Other Respiratory Diseases ...	·51	·25	...	·95	·79	·59	·75	1·90	·76	1·31	·22	1·64	·78
Dysentery	·62	1·00	7·12	5·45	1·90	2·02	3·39	·95	2·44	3·49	2·64	6·58	2·57
Diarrhœa	·31	·25	1·94	·63	·79	1·26	1·26	·71	1·37	1·31	·11	1·64	·80
Hepatic Abscess	·21	·25	...	·16	·13	...	...	...	...	...	·11	...	·10
Anæmia and Debility	·21	·25	·65	·47	·35	·34	1·13	·24	·46	1·31	·33	1·64	·45
Phagedæna, Slough, and Gangrene	...	...	...	...	·04	·25	...	...	...	...	...	...	·04
ALL CAUSES ...	12·85	9·52	27·18	24·39	14·97	17·00	25·38	12·13	16·46	24·45	17·90	27·96	17·72
V.—PERCENTAGE IN 100 ADMISSIONS—													
Influenza	·33	...	10·31	1·06	·33	1·03	·14	...	·71	·09	...	...	·78
Cholera	·21	...	...	·15	·06	·01	...	...	·02	...	3·10	...	·24
Small-pox	·04	·09	...	·10	·30	·08	...	...	·02	...	·03	...	·11
Enteric Fever	...	·09	·07	·03	·04	·13	·12	...	·08	2·37	·15	·25	·11
Intermittent Fever	14·30	14·18	37·74	32·00	32·83	39·45	31·42	24·51	29·45	19·98	14·71	27·21	30·49
Remittent Fever	·17	·27	·22	·28	·06	·06	·09	·04	·25	·27	·18	4·17	·17
Simple Continued Fever ...	6·88	2·29	...	·18	·96	·28	·20	...	·08	1·09	2·19	·49	·82
Tubercle of the lungs	2·32	1·01	·82	1·65	·90	1·11	1·50	·39	·38	2·28	1·67	·25	1·21
Pneumonia	·34	1·74	·60	1·16	1·59	2·84	4·29	2·76	·50	1·46	1·23	1·72	1·85
Other Respiratory Diseases ...	2·82	2·65	1·35	3·41	3·61	5·10	8·27	5·73	3·19	7·66	4·39	5·15	4·42
Dysentery	4·27	15·74	20·08	20·21	10·46	4·56	7·12	2·87	6·44	15·69	13·66	9·80	10·88
Diarrhœa	2·65	3·11	6·20	9·07	4·93	3·61	6·36	5·27	5·33	8·39	·94	6·13	5·51
Spleen Diseases	·04	...	...	·03	·13	·07	·39	·25	·31	·09	...	...	·13
Scurvy	·21	...	·35	·01	·06	·06	·41	·07	·27	·09	...	·25	·11
Anæmia and Debility	·70	1·37	1·79	1·78	2·01	1·92	1·55	1·33	1·49	3·01	2·46	1·96	1·80
Abscess, Ulcer and Boil ...	20·89	16·93	4·71	4·93	12·63	13·40	14·26	16·88	12·35	6·39	6·96	11·76	11·30
VI.—PERCENTAGE IN 100 DEATHS—													
Cholera	2·4	...	...	2·6	1·5	...	...	...	...	...	23·9	...	3·3
Small-pox	...	...	...	1·0	·9	...	...	...	...	...	...	...	·4
Enteric Fever	...	2·6	2·4	·6	·6	1·5	1·0	...	...	12·5	·6	...	1·1
Intermittent Fever... ...	1·6	2·6	14·3	6·1	5·0	4·5	2·5	2·0	2·8	3·6	4·9	5·9	4·5
Remittent Fever	·8	2·6	...	1·0	...	·5	1·0	...	2·8	...	1·2	5·9	·8
Simple Continued Fever ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tubercle of the lungs	33·6	...	9·5	17·5	13·0	14·4	16·3	7·8	11·1	19·6	13·5	...	15·6
Pneumonia	4·0	15·8	11·9	12·3	16·5	23·8	35·6	25·5	4·6	14·3	8·6	...	16·4
Other Respiratory Diseases ...	4·0	2·6	...	3·9	5·3	3·5	3·0	15·7	4·6	5·4	1·2	5·9	4·1
Dysentery	4·8	10·5	26·2	22·3	12·7	11·9	13·4	7·8	14·8	44·3	14·7	23·5	14·6
Diarrhœa	2·4	2·6	7·1	9·6	5·3	7·4	5·0	5·9	8·3	5·4	·6	5·9	4·5
Hepatic Abscess	1·6	2·6	...	·6	·9	...	...	...	...	...	·6	...	·5
Anæmia and Debility	1·6	2·6	2·4	1·9	2·4	2·0	4·5	2·0	2·8	5·4	1·8	5·9	2·5
Phagedæna, Slough, and Gangrene	...	...	...	...	·3	1·5	...	...	...	...	...	...	·2

* Including Aden.

GENERAL POPULATION.

TABLE XVII.—PROVINCIAL BIRTH AND DEATH STATISTICS.

PROVINCE.	Year.	BIRTHS.			NUMBER OF DEATHS.			RATIO OF DEATHS PER 1,000 OF POPULATION.			HIGHEST DEATH-RATE.		LOWEST DEATH-RATE.		MEAN DEATH-RATE DURING PREVIOUS FIVE YEARS.			Number of deaths of males to every 100 deaths of females.
		Total number.	Ratio per 1,000 of population.	Mean ratio per 1,000 of population during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	Total.	
Lower Burma	1906	180,035	32·33	32·60	30,247	120,946	151,193	42·59	24·81	27·15	65·34	40·76	17·22	15·37	38·14	21·53	25·83	127
	1907	181,834	32·65	32·90	30,183	119,289	149,472	42·18	24·58	26·84	65·20	31·88	27·93	17·01	36·70	22·39	23·92	131
Upper Burma	1906	*	*	*	15,279	61,214	76,493	50·42	23·41	26·22	57·12	35·44	22·35	17·27	34·00	18·20	19·84	100
	1907	96,699	33·24	*	13,087	63,133	76,220	39·69	24·39	26·13	47·75	38·86	17·14	17·75	37·57	20·87	22·33	102
Eastern Bengal and Assam.	1906	1,114,526	37·38	39·63	15,253	928,082	944,335	24·15	31·83	31·67	85·79	49·19	5·73	23·24	25·33	31·80	31·66	110
	1907	1,103,592	37·02	39·31	14,417	859,335	873,752	22·67	29·45	29·30	43·85	43·80	8·02	21·55	24·99	30·35	30·19	110
Bengal	1906	2,886,725	37·32	37·59	183,152	2,710,091	2,823,243	35·03	36·15	36·08	74·43	48·41	7·97	23·59	38·08	33·88	34·15	108
	1907	1,995,425	37·70	36·08	116,872	1,789,020	1,906,192	36·23	37·88	37·72	95·95	56·09	7·66	23·52	37·52	34·43	34·63	105
United Provinces of Agra and Oudh.	1906	1,918,425	40·22	44·25	165,052	1,698,284	1,863,336	49·15	38·31	39·07	111·95	81·02	24·78	24·25	49·14	35·27	36·36	104·76
	1907	1,963,963	41·18	44·04	285,190	1,887,346	2,072,536	55·14	42·57	43·46	142·82	87·38	28·89	24·18	80·69	37·16	38·18	102·49
Punjab	1906	878,006	43·7	41·6	90,182	652,724	742,906	44·83	36·08	36·94	80·25	49·87	9·16	20·05	46·65	45·01	45·17	101·9
	1907	819,572	40·8	43·3	110,180	1,138,549	1,248,729	54·65	62·93	62·10	144·31	106·67	22·25	19·02	48·44	44·99	45·33	104·3
North-West Frontier Province.	1906	76,834	38·6	83·2	6,138	61,031	67,140	36·28	33·56	33·73	52·21	45·77	16·79	31·41	28·63	25·30	25·57	101·6
	1907	62,062	32·5	36·3	6,072	60,945	67,017	36·00	35·04	35·12	58·47	41·59	13·82	31·63	30·87	29·51	29·62	109·5
Ajmer Merwara.	1906	13,789	30·51	30·51	5,731	9,636	15,367	44·21	27·75	32·22	70·94	45·24	31·65	20·50	41·76	27·41	31·31	105·14
	1907	14,881	32·20	33·06	5,288	8,843	14,132	40·79	25·46	29·63	62·02	43·01	25·52	17·42	48·79	26·78	31·13	106·96
Central Provinces and Berar.	1906	614,616	51·72	45·83	61,507	455,106	516,613	50·02	42·71	43·47	220·59	65·01	19·04	30·09	41·71	30·08	31·38	107·89
	1907	623,529	52·46	50·47	55,478	440,125	495,603	45·11	41·30	41·70	93·28	59·58	19·51	32·11	46·62	37·14	38·21	108·18
Bombay Presidency.	1906	585,486	33·84	31·75	129,893	518,126	648,619	53·76	32·25	33·06	103·56	42·74	8·75	19·88	56·15	36·03	38·06	107·70
	1907	610,533	33·03	33·47	99,880	506,726	606,606	38·19	31·54	32·82	82·36	56·82	10·43	13·29	55·33	35·68	38·25	107·23
Coorg	1906	4,713	30·10	23·31	358	4,727	5,285	36·59	29·26	29·76	49·73	34·06	21·20	23·69	41·97	28·42	29·57	119·29
	1907	4,304	23·83	24·76	672	5,677	6,349	44·02	34·34	35·25	68·64	44·23	32·50	27·02	38·65	27·25	28·28	119·83
Madras Presidency.	1906	1,135,078	30·9	29·4	142,109	856,282	998,391	33·4	26·6	27·4	77·5	33·9	6·2	20·9	20·2	20·5	21·5	103·5
	1907	1,119,170	30·8	30·6	121,481	761,735	883,016	28·5	23·7	24·3	66·4	37·1	4·5	17·0	29·3	21·9	22·7	103·6

* Data not available.

TABLE XVIII—BIRTHS.

Province.	Population under registration.	Ratio of Births per 1,000 of population.			Number of males born to every 100 females born.	Excess of births over deaths per 1,000 of population.	Excess of deaths over births per 1,000 of population
		Maximum for any one district.	Minimum for any one district.	Mean for the province.			
Burma {Lower	5,568,479	45·92	16·62	32·65	107	5·81	...
Burma {Upper	2,917,501	43·19	21·64	33·14	106	7·01	...
Eastern Bengal and Assam	29,812,735	49·45	29·94	37·01	104	7·71	...
Bengal	50,528,446	54·59	19·13	37·70	105	...	·02
United Provinces of Agra and Oudh	47,691,782*	54·95	28·52	41·18	108·57	...	2·28
Punjab	20,108,690	68·2	21·4	40·8	110·5	...	21·3
North-West Frontier Province	1,908,184	36·7	27·0	32·5	120·4	...	2·6
Ajmer-Merwara	476,912	44·49	27·25	31·20	118·68	1·57	...
Central Provinces and Berar	11,884,340	59·80	47·07	52·46	105·32	10·76	...
Bombay Presidency	18,481,362	55·95	14·66	33·03	107·90	·21	...
Coorg	180,607	37·56	17·15	23·83	108·02	...	11·32
Madras Presidency	36,362,222	39·1	23·1	30·8	104·9	6·5	...

*Includes 16,010 persons enumerated at the Ajodhia Fair.

TABLE XIX—DEATHS.

Province.	Population under registration.	Area in square miles.	Average population per square mile.	Ratio of deaths per 1,000 of population.			Death rate by sex.	
				Maximum for any one district.	Minimum for any one district.	Mean for the year.	Male.	Female.
Burma {Lower	5,568,479	76,992	72	45·00	18·87	26·84	28·51	24·77
Burma {Upper	2,917,501	29,411	99	39·32	18·50	26·13	27·66	24·75
Eastern Bengal & Assam	29,812,735	71,555	416	48·63	21·38	29·30	30·23	28·34
Bengal	50,528,446	110,469	457	56·00	23·73	37·72	39·03	36·43
United Provinces of Agra and Oudh.	47,691,782*	107,164	445	87·97	26·91	43·46	42·61	44·36
Punjab	20,108,690	97,209	207	104·3	22·4	62·1	59·0	65·7
North-West Frontier Province.	1,908,184	13,688	149	40·3	32·2	35·1	34·4	36·0
Ajmer-Merwara.	476,912	2,711	176	30·78	25·75	29·63	29·09	30·22
Central Provinces and Berar	11,884,340	97,843	121	58·32	32·37	41·70	43·77	39·67
Bombay Presidency	18,481,362	122,984	150	56·76	17·85	32·82	32·94	32·70
Coorg	180,607	1,583	114	44·23	31·12	35·15	34·44	36·04
Madras Presidency	36,362,222	129,241	281	49·8	18·3	24·3	25·1	23·5

*Includes 16,010 persons enumerated at the Ajodhia Fair.

TABLE XX—DEATHS IN TOWNS AND RURAL CIRCLES COMPARED.

Province.	Number of Registration Circles.			Population.			Ratio of Deaths per 1,000 of Population.		
	Rural.	Town.	Total.	Rural.	Town.	Total.	Rural.	Town.	Total.
Burma {Lower	212	40	252	4,852,961	715,518	5,568,479	24·58	42·18	26·84
Burma {Upper	113	17	130	2,587,732	329,769	2,917,501	24·39	39·69	26·13
Eastern Bengal and Assam.	242	54	296	29,177,017	635,718	29,812,735	29·45	22·67	29·30
Bengal	401	128	529	47,319,539	3,208,907	50,528,446	37·82	36·23	37·72
United Provinces of Agra and Oudh.	857	446	1303	44,333,027	3,358,755	47,691,782*	42·57	55·14	43·46
Punjab	407	144	551	18,092,723	2,015,967	20,108,690	62·93	54·65	62·10
North-West Frontier Province.	64	11	75	1,739,531	168,653	1,908,184	35·04	36·00	35·12
Ajmer-Merwara	17	6	23	347,280	129,632	476,912	25·46	40·79	29·63
Central Provinces and Berar.	264	104	368	10,654,609	1,229,731	11,884,340	41·30	45·11	41·70
Bombay Presidency	224	56	280	16,065,004	2,625,420	18,481,362	31·54	38·19	32·82
Coorg	5	5	10	165,358	15,249	180,607	34·34	44·01	35·15
Madras Presidency	185	232	417	32,112,173	4,250,049	36,362,222	23·7	28·5	24·3

* Includes 16,010 persons enumerated at the Ajodhia Fair.

GENERAL POPULATION.

TABLE XXI.—DEATHS ACCORDING TO AGE.

Province.	Ratio per 1,000 of population.																	
	Under one year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.		20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years and upwards.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Burma { Lower	297·70	212·43	30·01	25·33	16·14	14·23	11·66	9·94	16·20	12·61	16·61	14·35	21·00	19·39	27·62	22·90	32·85	27·56	69·63	67·11
Burma { Upper	328·20	239·37	25·18	23·67	12·36	11·66	7·80	7·53	12·87	10·36	11·76	11·71	14·69	15·07	17·59	15·42	27·82	21·88	70·69	62·85
Eastern Bengal and Assam.	215·79	183·82	39·20	34·61	15·79	12·58	11·39	10·43	16·76	19·07	17·62	20·29	21·05	23·20	26·90	24·20	40·47	36·09	77·74	61·55
Bengal* ...	288·30	252·61	36·09	30·74	23·06	20·27	17·03	15·57	19·70	19·58	22·74	22·34	26·46	23·94	32·80	27·46	50·39	46·25	99·63	84·02
United Provinces of Agra and Oudh.	347·97	307·51	80·32	79·23	20·81	22·03	14·49	18·08	18·49	23·76	21·23	24·50	24·27	25·95	32·98	31·87	51·76	48·85	92·89	79·87
Punjab ...	307·80	305·96	75·83	80·66	30·68	38·31	32·86	47·25	37·98	44·11	38·51	40·85	43·05	48·43	55·69	59·10	72·00	76·88	123·99	134·63
North-West Frontier Province.	209·64	173·72	52·13	51·63	13·28	13·94	8·70	11·75	11·75	9·38	12·69	16·64	18·29	25·14	30·43	33·08	47·44	48·93	95·07	99·05
Ajmer-Merwara	248·28	242·57	120·87	122·63	9·80	11·07	4·34	6·20	6·49	12·05	11·32	12·67	14·52	15·90	23·74	19·12	39·00	35·90	88·70	74·33
Central Provinces and Berar.	Not available.																			
Bombay Presidency.	316·45	276·14	53·92	51·85	12·01	13·32	11·21	13·71	16·86	19·68	18·76	20·63	21·96	21·74	30·35	24·77	44·68	37·48	96·35	86·72
Coorg ...	245·11	187·12	51·26	46·07	12·45	13·31	9·42	7·99	12·73	15·36	20·21	29·78	34·09	37·20	46·66	47·84	57·42	61·02	100·54	85·55
Madras Presidency.	195·1	162·1	33·4	32·0	10·4	9·7	7·2	7·2	10·2	13·3	12·4	13·0	14·2	15·1	20·2	16·1	31·8	26·3	73·5	68·5

* Excluding Sambalpur District for which the population figures are not available.

TABLE XXII.—DEATHS ACCORDING TO CAUSE.

Province.	Deaths per 1,000 of population in 1907.								All causes.	Ratio of deaths in 1906.	Ratio of deaths in 1905.
	Cholera.	Small-pox.	Plague.	Fevers.	Dysentery and Diarrhœa.	Respiratory diseases.	Injuries.	All other causes.			
Burma ... { Lower	1·43	·28	1·07	10·28	1·61	·70	·30	11·17	26·84	27·15	24·93
Burma ... { Upper	·14	·46	1·12	7·53	·47	·64	·45	15·30	26·13	26·22	22·46
Eastern Bengal and Assam ...	2·58	·29	·0002	21·17	·68	·09	·35	4·12	29·30	31·67	35·06
Bengal	4·07	·57	1·65	23·18	1·92	·29	·50	6·41	37·72	36·08	38·53
United Provinces of Agra and Oudh	·47	·47	6·90	28·31	·47	·46	·50	5·87	43·46	39·07	44·00
Punjab	0·02	0·55	30·27	20·16	0·75	3·20	0·32	6·82	62·10	36·94	47·55
North-West Frontier Province ...	0·14	0·40	0·81	27·44	0·29	0·99	0·35	4·69	35·12	33·73	26·79
Ajmer-Merwara	·002	1·04	·03	23·31	1·04	·78	·44	3·00	29·63	32·22	34·25
Central Provinces and Berar ...	0·36	0·32	3·18	18·00	3·94	2·64	0·53	12·73	41·70	43·47	37·21
Bombay Presidency	·41	·10	5·06	14·09	2·91	3·14	·37	6·74	32·82	35·06	31·84
Coorg	1·04	1·17	·01	26·95	2·08	·43	·07	3·41	35·15	29·26	26·24
Madras Presidency	2·2	0·6	0·1	7·8	1·7	0·7	0·3	10·9	24·3	27·4	21·4

TABLE XXIII.—*Total number of deaths by months.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.	RATIO PER 1,000 OF POPULATION. 1907.	1906.
Burma. Lower ...	12,902	12,142	11,923	12,079	10,667	10,828	12,858	13,493	12,924	12,063	12,634	14,959	149,472	26·84	27·15
Burma. Upper ...	8,677	6,892	6,511	5,688	4,982	5,430	6,526	6,322	5,910	5,822	6,291	7,169	76,220	26·13	26·22
Eastern Bengal and Assam.	95,447	69,894	73,099	80,149	60,346	53,463	62,158	51,064	57,761	70,782	86,356	113,233	873,752	29·30	31·67
Bengal ...	161,011	145,725	157,986	182,144	127,004	106,088	131,382	139,007	164,713	180,256	189,245	221,631	1,906,192	37·72	26·08
United Provinces of Agra and Oudh.	151,237	151,472	237,001	257,601	210,452	156,102	137,730	115,504	137,021	156,648	166,244	195,524	2,072,536	43·46	39·07
Punjab ...	77,599	87,423	154,720	240,313	246,073	99,144	52,103	38,816	49,953	60,828	65,029	76,728	1,248,729	62·10	36·94
North-West Frontier Province.	8,682	6,646	5,919	4,287	4,793	5,532	4,217	4,034	4,391	4,900	6,407	7,209	67,017	35·12	33·73
Ajmer-Merwara.	1,455	1,168	1,375	1,044	1,156	975	758	840	1,191	1,254	1,227	1,688	14,131	29·63	32·22
Central Provinces and Berar	37,390	39,535	44,823	34,006	33,243	33,188	32,482	46,658	56,185	55,216	43,903	38,974	495,603	41·70	43·47
Bombay Presidency.	55,966	49,947	57,808	44,503	39,474	36,874	45,565	53,507	61,815	63,028	49,424	46,695	606,606	32·82	35·06
Coorg ...	383	379	612	543	704	756	648	527	521	395	398	483	6,349	35·15	29·26
Madras Presidency.	83,997	68,410	61,540	56,782	61,496	62,137	73,274	84,470	76,906	73,142	82,727	98,135	883,016	24·3	27·4
Total ...	694,746	639,633	813,317	919,139	809,390	570,517	559,701	556,242	629,291	684,334	709,885	822,428	8,399,623	37·18	34·73

TABLE XXIV.—*Ratio of deaths from all causes according to months.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Burma ... Lower ...	2·32	2·18	2·14	2·17	1·92	1·94	2·31	2·42	2·32	2·17	2·27	2·69	26·84
Burma ... Upper ...	2·97	2·36	2·23	1·94	1·71	1·86	2·24	2·17	2·02	2·00	2·16	2·46	26·13
Eastern Bengal and Assam ...	3·20	2·34	2·45	2·68	2·02	1·79	2·08	1·71	1·93	2·37	2·89	3·79	29·30
Bengal	3·18	2·88	3·12	3·60	2·52	2·09	2·60	2·75	3·25	3·56	3·74	4·38	37·72
United Provinces of Agra and Oudh ...	3·17	3·18	4·97	5·40	4·41	3·27	2·89	2·42	2·87	3·28	3·48	4·10	43·46
Punjab	3·86	4·35	7·69	11·95	12·24	4·93	2·59	1·93	2·48	3·02	3·23	3·82	62·10
North-West Frontier Province	4·54	3·48	3·10	2·25	2·51	2·90	2·21	2·11	2·30	2·57	3·36	3·78	35·12
Ajmer-Merwara	3·05	2·45	2·88	2·19	2·42	2·04	1·59	1·76	2·50	2·63	2·57	3·54	29·63
Central Provinces and Berar	3·15	3·33	3·77	2·86	2·80	2·79	2·73	3·92	4·73	4·65	3·69	3·28	41·70
Bombay Presidency	3·03	2·70	3·13	2·41	2·14	2·00	2·46	3·00	3·34	3·41	2·67	2·53	32·82
Coorg	2·12	2·10	3·38	3·02	3·90	4·19	3·59	2·92	2·88	2·19	2·21	2·67	35·15
Madras Presidency	2·3	1·9	2·7	1·6	1·7	1·7	2·0	2·3	2·1	2·0	2·3	2·7	24·3

TABLE XXV—*Deaths from CHOLERA in the different provinces in India from 1887 to 1907.*

YEAR.	Lower Burma.	Upper Burma †	Assam.	Bengal.*	United Provinces of Agra and Oudh.	Punjab.	(a) North-West Frontier Province.	Ajmer-Merwara.	Central Provinces ¶	Berar.	Bombay.	Coorg.	Madras.	Rajputana.	Central India.	Hyderabad (cantonment stations).	Mysore.
1887	2,649	...	7,941	172,578	200,628	8,804	...	384	12,576	14,396	25,711	3	48,359	2,612	8,868	2,831	832
1888	15,982	...	9,693	111,391	18,704	14,938	...	13	921	365	36,500	2	58,677	32	191	2,057	1,015
1889	3,240	...	18,288	171,103	48,494	2,838	...	55	52,588	10,925	32,431	9	76,020	6,923	3,344	1,128	1,590
1890	1,076	...	15,396	145,885	80,295	3,401	...	408	4,787	847	3,759	5	35,288	2,746	3,132	...	1,326
1891	2,400	...	23,882	229,575	169,013	10,107	...	532	21,312	7,958	17,850	7	98,773	2,946	13,474	3,102	1,204
1892	6,208	...	21,552	259,398	194,886	75,959	...	2,352	39,972	2,630	42,900	58	79,033	26,760	8,384	53	3,497
1893	2,393	...	21,849	126,976	14,154	639	...	3	357	1,188	18,853	9	32,209	314	127	165	680
1894	7,428	...	15,497	236,150	178,079	113	...	...	7,043	3,452	33,588	8	47,289	2	5,216	1,862	328
1895	5,150	...	18,962	177,087	51,562	549	...	289	15,506	11,919	8,890	...	21,172	1,049	6,043	467	2,334
1896	2,959	...	17,042	226,824	69,147	5,146	...	12	52,985	12,264	35,404	49	47,847	3,797	15,766	525	2,100
1897	8,538	...	13,240	196,247	44,208	622	...	19	57,131	10,122	57,109	106	143,445	1,496	13,202	1,039	4,248
1898	2,972	...	11,149	65,020	2,568	338	...	1	7	...	4,368	8	65,444	6	2	6	1,193
1899	4,042	2,050	8,380	107,678	8,142	1,816	...	1	761‖	541	8,579	...	39,082	498	...	...	123
1900	3,440	41	33,761	345,878	84,960	28,260	...	4,842	63,114	18,375	163,889	...	60,662	28,719	20,450	3,813	779
1901	3,552	‡	7,468	110,753	53,995	180	117	50	49	17	13,600	58	81,370	6	72	1	11,351
1902	1,844	57	12,658	150,971	25,660	371	...	32	28	26	3,230	...	29,769	1,519	12	...	218
1903	5,346	2,887	8,360	203,405	47,139	14,688	1,354	...	437	...	1,825	...	27,393	236	1,110	...	98
1904	2,472	508	5,588	137,701	6,617	716	1	...	2,967	...	13,156	...	23,109	1	150	...	471
1905	3,511	1,836	142,312**	146,339	121,790	2,197	300	...	1,217	...	5,396	...	16,888	3	27	64	626
1906	5,529	2,343	168,278	192,596	149,549	4,232	...	284	38,768	...	46,119	10	142,811	4,714	10,147	1,061	7,223
1907	7,964	414	77,181	205,702	22,438	437	266	1	4,291	...	7,656	187	81,565	64	413	1	4,972

* Excluding Calcutta from 1887 to 1892.
† Statistics from 1887 to 1898 not available.
‡ Statistics not available.
§ Including 30 deaths in cantonments.
‖ Excluding Zamindaris.
¶ Including Berar from 1903.
** Eastern Bengal and Assam.
(a) 1887—1900 included in the Punjab.

Central Population.

TABLE XXVI.—*Deaths from* CHOLERA *in British Provinces, by months, during the year 1907.*

Provinces.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population. 1907.	1906.
Burma {Lower ...	450	716	1,664	1,139	922	283	192	263	370	434	539	992	7,964	1·43	·99
Burma {Upper ...	119	24	4	28	21	7	1	1	1	13	132	65	414	·14	·80
Eastern Bengal and Assam.	11,645	8,675	10,902	11,078	3,984	1,598	1,872	1,101	1,311	4,780	9,963	10,272	77,181	2·58	3·63
Bengal ...	15,931	17,547	16,056	16,026	9,796	9,860	12,645	20,706	25,564	21,670	18,216	31,685	205,702	4·07	3·81
United Provinces of Agra and Oudh.	717	895	797	1,172	630	1,437	1,682	1,459	3,700	5,712	3,120	1,127	22,438	·47	3·14
Punjab ...	...	...	2	...	11	62	34	31	154	58	79	6	437	0·02	0·21
North-West Frontier Province.	...	...	...	...	...	...	1	...	38	165	62	...	266	0·14	...
Ajmer-Merwara ...	...	...	...	...	...	1	...	...	...	...	...	...	1	·002	·60
Central Provinces and Berar.	46	354	250	29	19	5	79	1,224	1,570	667	41	2	4,291	0·36	3·26
Bombay Presidency.	190	110	443	470	399	661	2,580	1,750	607	235	121	90	7,656	·41	2·50
Coorg ...	3	4	75	29	33	25	-	...	...	...	1	17	187	1·04	·96
Madras Presidency.	8,234	6,426	3,600	2,872	3,337	4,385	5,947	10,872	8,771	4,371	8,819	13,031	81,565	2·2	3·9
Total ...	37,335	34,751	33,793	32,843	19,152	18,324	25,033	37,407	42,086	38,203	41,083	48,192	408,102	1·81	3·05

TABLE XXVII.—*Details of the distribution and occurrence of* CHOLERA *during the year 1907.*

Province.	Mortality in 1907.	Mean mortality of previous 5 years.	Urban mortality.	Rural mortality.	Percentage of villages attacked.	Maximum mortality in any one district excluding towns.	Maximum mortality in any one town.	Month of maximum mortality.
Burma {Lower ...	1·43	·67	3·55	1·12	10·68	3·62	14·42	March.
Burma {Upper ...	·14	·53	·35	·12	0·87	·52	9·79	November.
Eastern Bengal and Assam ...	2·58	2·77	7·85	2·38	13·97	8·79	9·79	January.
Bengal	4·07	2·75	4·63	4·03	18·82	15·61	44·15	September.
United Provinces of Agra and Oudh ...	·47	1·47	·41	·47	2·38	4·57	5·93	October.
Punjab	0·02	0·22	0·12	0·01	0·20	0·68	4·41	September.
North-West Frontier Province ...	0·14	0·17	0·27	0·13	0·91	0·91	2·54	October.
Ajmer-Merwara	·002	·13	·01	...	0·84	...	05	June.
Central Provinces and Berar ...	0·36	0·73	0·38	0·36	1·44	1·32	6·94	September.
Bombay Presidency	·41	·75	·80	·35	2·81	1·38	39·96	July.
Coorg	1·04	·01	·39	1·09	...	2·42	1·40	March.
Madras Presidency	2·2	1·3	2·2	2·2	14·87	8·7	28·7	December.

General Population.

TABLE XXVIII.—*Small-pox mortality.*

PROVINCES, DISTRICTS, TOWNS.	Lower Burma.	Upper Burma.	Eastern Bengal and Assam.	Bengal.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Ajmer-Merwara.	Central Provinces and Berar.	Bombay Presidency.	Coorgs.	Madras Presidency.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months :—													
January	146	110	614	2,214	801	1,041	75	15	307	184	9	2,052	7,568
February	125	116	789	2,401	919	919	68	24	252	240	10	2,211	8,074
March	163	169	1,032	3,481	1,557	983	24	44	249	328	32	2,454	10,516
April	260	304	1,353	5,393	2,782	946	17	97	410	373	40	2,043	13,918
May	276	236	1,199	4,335	3,482	1,176	17	117	467	243	21	1,811	13,380
June	187	175	1,039	3,711	3,634	1,341	54	65	498	177	16	1,680	12,588
July	142	115	775	2,267	3,073	1,175	79	11	367	113	6	1,699	9,822
August	80	53	441	954	1,533	685	67	5	262	49	7	1,756	5,892
September	74	26	330	609	594	378	37	2	128	37	19	1,754	3,988
October	22	14	241	514	448	328	32	...	119	21	17	1,571	3,327
November	41	12	313	838	982	617	109	24	242	28	20	1,635	4,861
December	16	20	567	2,449	2,840	1,493	190	102	525	69	14	1,789	10,074
Total ...	1,532	1,350	8,693	29,066	22,645	11,082	769	497	3,826	1,862	211	22,455	103,988
B.—Annual death ratios :—													
Ratio per 1,000 of population 1907.	·28	·46	·29	·57	·47	0·55	0·40	1·04	0·32	·10	1·17	0·6	0·46
Ratio per 1,000 of population 1906.	1·42	·22	·23	·43	·28	0·66	0·57	·57	0·83	·22	1·30	0·8	0·48
Difference ...	−1·14	+·24	+·06	+·14	+·19	−·11	−·17	+·47	−·51	−·12	−·13	−·2	−·02
Mean ratio per 1,000 during 1902-1906	·63	·19	·28	·44	·21	0·55	0·74	·29	0·45	·33	·49	0·5	0·39
Difference ...	−·35	+·27	+·01	+·13	+·26	...	−·34	+·75	−·13	−·23	+·68	+·1	+0·07
II.—District mortality excluding towns :—													
Number of districts affected ...	14	9	22	32	45	29	4	16	23	19	5	22	240
Highest district ratio ...	1·27	2·29	3·44	3·07	2·15	1·71	0·90	3·54	2·68	1·50	3·65	2·9	3·65
Name of that district	Akyab	Pakokku	Kamrup	Puri	Partabgarh.	Gurgaon	Peshawar	Pohkar	Mandla	Kanara	Mercara	North Arcot.	Mercara.
Lowest district ratio	·01	·07	·002	·04	·01	0·01	0·03	·05	0·02	·00	·03	0·1	·00
Name of that district	Henzada	Shwebo	Cachar	Khulna	Cawnpore	Dera Ghazi Khan	Kohat	Nasirabad	Burhanpur.	Hyderabad.	Kiggatnad	Ganjam	Hyderabad.
Number of districts without mortality	4	2	None	None	3	None	1	1	1	6	None	None	18
District death rate per 1,000 of population.	·30	·50	·28	·54	·49	0·47	0·39	1·20	0·33	·10	1·17	0·7	0·46
III.—Town mortality :—													
Number of towns affected ...	12	3	28	103	64	111	4	2	37	18	3	107	493
Highest town ratio	2·38	2·11	9·15	13·91	2·55	14·70	3·29	1·23	4·13	2·74	1·93	4·3	14·70
Name of that town	Gyobingauk.	Myingyan	Barpeta	Deoghur	Sahaswan.	Narowal	Buffa	Ajmer Town.	Mehkar	Ratnagiri	Mercara	Chittoor	Narowal.
Lowest town ratio	·05	·10	·05	·03	·01	0·02	0·04	·73	0·03	·01	·57	0·02	0·01
Name of that town	Rangoon	Pakokku	Brahmanbaria.	Darbhanga.	Agra	Delhi.	Dera Ismail Khan.	Ajmer Suburb.	Akola	Hyderabad.	Somwarpet.	Calicut	Agra.
Number of towns without mortality	28	14	26	25	42	33	7	4	67	45	2	125	428
Town death rate per 1,000 of population.	·09	·18	·43	1·04	·20	1·30	0·55	·62	0·20	·08	1·17	0·2	0·47
IV.—Infantile mortality :													
Children under one year ...	147	9	1,514	5,074	7,678	2,356	93	150	1,302	356	...	7,699	27,126
Children 1—10 years ...	568	200	3,435	11,748	11,589	6,481	4 573	346	1,512	619	...	8,285	45,256
Percentage of children in total small-pox mortality.	46·67	19·41	56·93	57·88	85·06	83·35	86·61	99·80	73·55	52·36	...	72·52	69·70

TABLE XXIX.—*Fever mortality.*

PROVINCES, DISTRICTS, TOWNS.	Lower Burma.	Upper Burma.	Eastern Bengal and Assam.	Bengal.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Ajmer-Merwara.	Central Provinces and Berar.	Bombay Presidency.	Coorg.	Madras Presidency.	Registration India.
I.—Mortality by Provinces.													
A.—Deaths by months.													
January	6,095	2,646	65,241	99,658	105,750	40,608	7,397	1,311	15,410	31,281	317	37,279	403,905
February	4,968	1,890	47,586	84,496	92,999	32,647	5,491	940	15,752	24,623	292	32,112	333,895
March	3,999	1,859	49,058	84,098	119,399	34,479	4,791	1,132	16,485	25,495	418	31,385	362,459
April	4,682	1,804	55,227	98,522	112,362	28,153	3,323	742	14,124	19,437	379	20,184	355,389
May	3,430	1,390	45,323	86,147	112,524	20,381	3,442	804	15,756	18,573	404	21,424	330,683
June	4,111	1,546	41,318	66,458	110,638	20,775	3,831	756	16,525	16,492	559	21,005	313,024
July	5,003	1,978	48,597	80,740	100,538	27,499	3,964	820	14,514	18,240	533	23,914	324,531
August	5,218	1,374	30,193	81,745	83,191	23,105	3,028	665	19,282	19,591	427	25,984	303,003
September	4,714	1,463	46,470	98,168	101,486	30,383	3,458	942	22,727	20,714	442	23,929	352,692
October	4,389	1,522	51,983	119,521	121,645	38,606	3,756	992	24,866	21,827	315	24,454	412,874
November	4,883	1,891	60,925	134,078	132,543	41,789	5,040	947	29,660	21,634	317	24,698	450,375
December	6,350	2,516	82,376	140,509	156,330	49,695	5,710	1,276	17,789	22,412	377	28,393	522,733
Total ...	57,266	21,979	631,197	1,171,540	1,350,405	405,481	52,381	11,117	213,908	260,339	4,869	284,430	4,464,881
B.—Annual death ratios.													
Ratio per 1,000 of population 1907.	10·28	7·53	21·17	23·18	28·31	20·16	27·44	23·31	38·00	14·09	26·95	7·8	19·76
Ratio per 1,000 of population 1906	9·77	7·34	21·65	22·41	27·62	20·28	26·14	25·77	18·95	14·85	23·62	8·0	19·69
Difference ...	+·51	+·19	−·48	+·77	+·69	−·12	+1·30	−2·46	+·95	−·77	+·33	−·2	+0·07
Mean ratio per 1,000 during 1902-06...	9·53	7·02	23·01	21·86	26·12	21·27	22·83	23·83	16·34	14·09	23·35	7·9	19·19
Difference ...	+·76	+·51	−1·84	+1·32	+2·19	−1·11	+4·61	−·52	+1·66	...	+·60	−·1	+·57
II.—District mortality excluding towns.													
Number of districts affected ...	18	11	22	32	48	29	5	17	24	25	5	22	258
Highest district ratio ...	16·86	13·11	39·40	38·39	50·17	29·99	34·24	41·34	38·64	26·95	35·95	19·1	50·17
Name of that district ...	Prome	Mandalay	Dinajpur	Birbhum	Saharanpur.	Karnal	Dera Ismail Khan.	Goelia	Damoh	Sukkur	Padinalknad.	Ganjam	Saharanpur.
Lowest district ratio ...	2·85	3·88	9·49	7·90	15·42	4·34	25·89	15·01	7·67	5·90	20·73	·7	·7
Name of that district ...	Maubin	Myingyan	Sylhet	Puri	Ballia	Simla.	Peshawar	Todgarh	Buldana	Belgaum	Vedenalknad.	Salem	Salem.
Number of districts without mortality	None	None	None	None	None	None	None	None	None	None	None	None	None
District death rate per 1,000 of population.	10·97	8·03	21·37	23 4	28·44	20·28	28·25	23·44	18·84	14·82	27·84	8·1	20·34
III.—Town mortality.													
Number of towns affected ...	40	17	54	128	106	144	11	6	104	63	5	129	907
Highest town ratio ...	16·60	7·88	35·33	46·08	82·06	46·33	38·27	41·77	26·49	33·88	33·13	26·6	82·06
Name of that town ...	Mergui	Sagaing	Sherpur	Murshidabad.	Deoband	Faridabad	Buffa	Beawar	Pachmarhi	Umarket.	Fraserpet	Srungavarapukota.	Deoband.
Lowest town ratio ...	1·62	1·05	2·82	1·68	5·98	2·84	5·45	11·91	1·19	1·71	1·87	0·1	0·1
Name of that town ...	Henzada	Myingyan	Maulvi Bazar	Budge Budge	Bansdih	Khangah Dogran.	Tank	Nasirabad	Schora	Athni	Viranjendrapet.	Cuddalore	Cuddalore.
Number of towns without mortality.	None	None	None	None	None	None	None	None	None	None	None	3	3
Town death rate per 1,000 of population.	3·60	3·60	13·99	11·91	26·61	19·17	19·09	22·97	10·69	8·46	17·32	5·7	13·26

General Population.

TABLE XXX.—*Dysentery and Diarrhœa mortality.*

PROVINCES, DISTRICTS AND TOWNS.	Lower Burma.	Upper Burma.	Eastern Bengal and Assam.	Bengal.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Ajmer-Merwara.	Central Provinces and Berar.	Bombay Presidency.	Coorg.	Madras Presidency.	Registration India.
I.—Mortality by Provinces.													
A.—Deaths by months.													
January	593	102	2,392	4,940	1,734	1,222	75	34	2,269	3,158	7	5,468	21,994
February	731	87	1,639	4,118	1,282	987	44	30	2,193	2,827	10	4,378	18,326
March	759	96	1,557	3,644	1,582	949	38	28	2,326	2,937	27	3,710	18,109
April	790	82	1,620	3,940	1,777	918	39	39	2,252	3,115	30	3,406	18,008
May	780	83	1,667	2,974	2,043	1,432	41	25	2,418	3,639	91	3,783	18,978
June	678	92	1,618	3,649	2,498	1,480	63	27	2,389	3,998	87	3,881	19,460
July	937	210	1,593	3,708	2,336	1,104	28	13	3,250	5,818	44	5,108	24,155
August	1,012	142	2,439	4,488	3,086	1,023	49	29	6,494	8,227	17	6,241	31,137
September	784	144	1,482	6,208	2,942	1,448	44	101	8,098	6,610	11	5,339	32,311
October	627	109	1,789	5,127	2,899	1,759	55	83	7,136	5,215	14	4,853	28,670
November	564	114	1,904	4,129	1,608	1,515	45	38	4,608	3,986	8	6,162	24,682
December	689	114	1,757	5,745	1,681	1,263	33	44	3,328	3,784	28	7,997	26,463
Total ...	8,947	1,375	20,463	51,670	22,368	15,091	554	494	46,280	53,308	375	66,326	282,191
B.—Annual death ratios.													
Ratio per 1,000 of population 1905 ...	1·61	·47	·68	1·02	·47	0·75	0·29	1·04	3·94	2·91	2·08	1·7	1·25
Ratio per 1,000 of population 1906 ...	1·65	·68	·90	·96	·55	0·87	0·29	1·18	3·58	3·24	·78	1·7	1·32
Difference ...	—·04	—·21	—·22	+·06	—·08	—·12	...	—·14	+·36	—·43	+1·30	...	—0·07
Mean ratio per 1,000 during 1902-06 ...	1·45	·41	·71	·93	·61	0·74	0·31	·96	2·70	3·17	·63	1·3	1·16
Difference ...	+·16	+·06	—·03	+·09	—·14	+·1	—·1	+·08	+1·24	—·26	+1·45	+·4	+·09
II.—District Mortality excluding towns:—													
Number of districts affected	18	11	22	32	48	29	5	9	24	25	5	22	230
Highest district ratio ...	3·84	59	5·93	4·89	9·45	2·39	0·88	·28	15·07	19·28	4·08	5·7	15·07
Name of that district ...	Mergui	Pakokku	Lakhimpur	Puri	Garhwal	Rawalpindi.	Dera Ismail Khan.	Pohkar	Akola	East Khandesh	Kiggatnad.	The Nilgiris	Akola
Lowest district ratio ...	·49	·04	·01	·02	·04	0·14	0·04	·07	0·25	·02	·41	0·2	·02
Name of that district ...	Tharrawaddy.	Kyaukse	Dinajpur	Champaran	Bahraich	Muzaffargath	Peshawar	Masuda	Bhandara	Larkhana	Mercara	Vizagapatam	Dinajpur.
Number of districts without mortality.	None	None	None	None	None	None	None	3	None	None	None	None	3
District death rate per 1,000 of population.		·39	·66	·90	·35	0·61	0·21	·06	·36	1·81	1·64	1·4	1·11
III.—Town mortality:—													
Number of towns affected ...	39	16	52	123	95	139	10	4	104	63	3	203	836
Highest town ratio ...	7·05	3·03	8·01	9·96	6·45	7·54	4·54	8·36	16·09	10·89	17·28	10·8	17·28
Name of that town ...	Insein	Taungdwingyi	North Lakhimpur.	Lohardaga	Benares.	Sadhaura	Tank	Ajmer Suburb.	Ner Pingla.	Padhapur.	Virajendrapet	Seperumbadur.	Virajendrapet
Lowest town ratio ...	·11	·15	·14	·17	·04	0·21	0·17	·43	0·18	·16	·87	0·1	0·1
Name of that town ...	Letpadan	Pakokku	Begra	Meherpur	Bahraich	Hasanabad	Kohat	Kekri	Rafanpur	Viramgam	Somwarpet.	Bobbili	Bobbili
Number of towns without mortality.	1	1	2	5	11	5	1	2	None	None	2	24	54
Town death rate per 1,000 of population.	3·68	1·65	1·88	2·73	1·97	3·00	1·13	3·63	3·75	2·29	6·75	3·5	2·85

General Population.

TABLE XXXI.—*Plague Mortality.*

Province or State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total. 1907.	Total. 1906.
British Provinces:—														
Burma { Lower	453	709	918	1,009	472	554	617	466	272	167	134	261	5,972	5,223
Burma { Upper	1,275	1,161	516	57	6	1	8	34	40	7	45	133	3,277	3,474
Eastern Bengal and Assam	...	4	...	4	...	...	...	...	...	...	...	...	8	74
Bengal	5,801	10,944	23,970	30,070	8,078	894	306	448	486	313	468	1,219	83,602	59,619
United Provinces of Agra and Oudh.	21,209	36,777	87,243	109,619	61,936	7,357	358	310	622	680	863	1,988	388,862	69,660
Punjab	17,633	38,973	200,419	194,258	105,708	50,550	7,535	879	731	1,151	1,245	1,103	608,685	91,712
North-West Frontier Province.	...	...	3	42	419	684	270	41	2	14	29	43	1,547	41
Ajmer-Merwara ...	...	...	...	...	2	...	2	2	3	1	...	...	13	68
Central Provinces and Berar	5,383	7,589	11,396	4,727	1,394	55	40	928	3,389	1,580	728	561	37,774	18,121
Bombay	5,782	8,078	12,522	7,376	2,368	1,110	21,613	6,714	16,578	18,636	8,609	3,803	93,609	51,525
Coorg	...	...	...	...	...	...	...	...	1	1	...	...	2	...
Madras Presidency ...	84	105	76	45	23	41	91	232	792	578	400	405	2,872	898
Total { 1907 ...	57,320	102,249	237,051	348,607	270,406	61,246	11,840	10,004	22,925	23,148	11,931	9,516	1,166,223	...
Total { 1906 ...	17,417	29,888	86,933	70,288	38,635	4,371	2,154	5,181	12,613	15,319	17,122	30,444	...	330,355
Native States, etc.:—														
Eastern Bengal and Assam	...	...	...	...	...	7	...	...	...	...	...	...	7	...
United Provinces of Agra and Oudh.	...	...	...	...	...	...	...	...	...	...	...	...	185	...
Punjab	1,827	5,283	10,214	17,697	21,604	3,666	725	...	74	241	286	214	60,231	12,748
Jammu and Kashmir ...	351	318	980	884	595	54	21	2	2	3	4	3	3,027	2,736
Baluchistan	...	...	2	...	2	1	...	...	...	...	...	...	5	7
Rajputana	191	486	998	1,122	1,003	387	9	35	324	713	305	854	5,826	1,132
Central India	1,628	1,804	1,900	814	160	48	...	136	658	1,542	443	96	8,809	12,055
Central Provinces ...	40	161	54	...	...	...	...	...	...	...	...	...	255	...
Bombay Presidency ...	3,467	4,795	5,550	3,287	1,363	719	1,519	4,151	10,230	13,191	5,408	1,904	54,186	22,401
Hyderabad	123	22	8	114	17	...	41	498	520	921	466	308	3,038	1,250
Mysore	413	543	275	200	308	273	691	1,359	2,170	3,115	1,863	1,444	11,854	2,960
Bangalore Civil and Military Station.	97	75	46	25	28	15	37	85	278	243	212	214	1,355	1,077
Madras	...	...	...	...	...	...	...	...	...	...	...	1	1	...
Total { 1907 ...	7,937	12,487	20,027	24,143	24,482	5,050	3,043	6,468	14,255	20,166	9,988	4,938	149,669	...
Total { 1906 ...	2,195	3,525	5,478	7,070	5,215	1,498	701	2,752	6,737	8,582	6,679	6,918	...	56,366
Grand Total ... { 1907 ...	65,257	114,736	257,078	372,750	294,888	66,296	14,883	16,472	37,180	43,314	21,919	14,454	1,315,892	...
Grand Total ... { 1906 ...	19,612	32,423	69,411	77,358	43,850	5,869	2,855	7,939	19,350	23,901	23,801	37,362	...	386,721
Calcutta City	475	102	446	1,350	907	198	61	84	33	34	75	86	3,891	2,606
Bombay City	171	591	2,467	1,957	649	118	73	72	118	105	69	49	6,479	10,802
Madras City ...	...	...	...	...	...	1	...	...	...	1	...	1	3	56

General Population.

TABLE XXXII.—*Mortality from Respiratory Diseases.*

PROVINCES, DISTRICTS AND TOWNS.	Lower Burma.	Upper Burma.	Eastern Bengal and Assam.	Bengal.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Ajmer-Merwara.	Central Provinces and Berar.	Bombay Presidency.	Coorg.	Madras Presidency.	Registration Ind a.
I.—Mortality by provinces :—													
A.—Deaths by months—													
January	323	221	246	1,623	2,016	5,667	156	37	1,985	5,273	5	2,055	19,610
February	296	176	280	1,359	1,772	5,634	128	49	2,198	4,937	24	1,852	18,700
March	309	146	267	1,352	2,326	6,137	173	40	2,446	5,256	6	1,848	20,300
April	272	130	234	1,293	2,142	4,838	141	30	2,188	4,703	7	1,689	17,206
May	284	113	184	1,060	2,040	5,590	185	29	2,404	4,233	8	1,834	17,974
June	268	137	181	777	1,588	4,662	198	17	2,235	3,867	5	1,833	15,758
July	297	134	186	1,086	1,434	4,337	156	16	2,272	4,128	5	1,967	16,323
August	374	148	173	586	1,359	3,765	138	15	2,846	5,312	9	2,310	17,435
September	367	140	213	1,071	1,676	4,349	148	23	3,064	5,045	1	2,154	18,251
October	338	191	242	1,293	1,479	5,210	151	24	3,378	5,196	8	2,141	19,651
November	378	197	241	1,412	1,503	6,026	150	43	3,886	4,882	7	2,391	20,860
December	418	189	305	1,727	2,367	8,141	169	48	3,035	5,344	2	2,814	24,259
Total ...	3,924	1,857	2,752	15,039	22,122	64,356	1,893	371	31,337	58,068	77	24,628	226,419
B.—Annual death ratios :—													
Ratio per 1,000 of population 1907.	·70	·64	·09	·29	·46	2·20	0·99	·78	2·64	3·14	·43	0·7	1·06
Ratio per 1,000 of population 1906.	·72	·87	·07	·25	·42	2·84	0·69	·67	1·40	3·28	·24	0·7	0·89
Difference ...	— ·02	— ·23	+ ·02	+ ·04	+ ·04	+ ·36	+ ·30	+ ·11	+ 1·24	— 0·14	+ ·19	...	+ ·11
Mean ratio per 1,000 during 1901-05.	·53	·49	·05	·47	·81	2·95	0·52	·63	...	3·17	·12	0·4	*
Difference ...	+ ·17	+ ·15	+ ·04	+ ·12	+ ·03	+ ·25	+ ·47	+ ·16	...	— ·03	+ ·31	+ ·3	*
II.—District Mortality excluding towns.													
Number of districts affected ...	18	10	22	32	48	29	5	6	34	25	2	28	342
Highest district ratio	·88	·62	1·33	1·80	5·86	10·47	1·11	·32	12·18	9·05	·23	1·4	12·18
Name of that district	Tavoy	Lower Chindwin	Lakhimpur.	Puri	Hamirpur	Delhi	Hazara	Dewair	Saugor	Kaira	Mercara	Anantapur	Saugor
Lowest district ratio	·05	·04	·003	·0009	·01	0·07	0·31	·04	0·01	·02	·05	0·003	·0009
Name of that district	Pegu	Yamethin	Noakhali	Balasore	Gonda	Multan	Bannu	Kekri	Narsimghpur.	Larkhana	Kiggatnad	Nellore	Balasore
Number of districts without mortality.	None	1	None	None	None	None	None	11	None	None	3	1	16
District death rate per 1,000 of population.	·30	·18	·09	·17	·24	2·82	0·62	·06	2·46	2·23	·04	0·6	0·75
III.—Town Mortality :—													
Number of towns affected ...	31	17	34	96	97	144	11	3	98	61	3	177	771
Highest town ratio	9·76	9·66	1·40	5·90	12·12	17·33	8·96	5·15	2,149	20·26	12·14	10·2	21·49
Name of that town	Basseiu	Monywa	Mangaldai	Calcutta	Benares	Dadhaual	Hasipor	Ajmer Suburb.	Deori	Ahmednagar.	Virajendrapet.	Coonoor	Deori
Lowest town ratio	·13	·23	·05	·04	·05	0·29	0·99	3·00	0·15	·20	2·67	0·1	·04
Name of that town	Kyaikiat	Yamethin	Brahmanbaria.	Ranchi	Tanda	Kamalia	Kuiachi	Ajmer Town.	Siraigaon	Umarkot	Mercara	Chicacole	Ranchi
Number of towns without mortality.	9	None	20	32	9	None	None	3	6	42	3	55	139
Town death rate per 1,000 of population.	3·42	4·25	·27	2·05	3·41	6·65	4·85	2·70	4·80	8·48	4·59	1·4	3·68

* Not available.

TABLE XXXIII.—*General Population—Vaccination.*

A.—*Total Primary and Re-vaccinations, successful cases among the children, cost of the Special Vaccination Department, etc., during the official year 1907-08.*

PROVINCE.	NUMBER OF PERSONS VACCINATED BY THE SPECIAL AND DISPENSARY STAFFS COMBINED.		PERCENTAGE OF SUCCESSFUL CASES* TO TOTAL OPERATIONS.		NUMBER OF CHILDREN SUCCESSFULLY VACCINATED BY THE SPECIAL AND DISPENSARY STAFFS COMBINED.		Average number of operations performed by each vaccinator of the Special Staff.	Total cost of the Special Department.	Average cost of each successful case vaccinated by the Special Department.
	Primary.	Revaccination.	Primary.	Revaccination.	Under one year.	1 to 6 years.			
								Rs.	Rs. a. p.
Burma	330,975	55,558	91·86	58·97	82,606	160,070	1,331	2,38,604	0 6 12
Eastern Bengal and Assam	1,284,349	74,295	98·23	70·21	378,846	690,595	1,126	1,02,096	0 1 3
Bengal	1,848,121†	165,430‡	99·32	72·96	866,068	865,900	1,098	2,03,667	0 1 8
United Provinces of Agra and Oudh	1,569,231	139,948	97·85	83·92	958,006	475,548	1,343	1,62,530	0 1 7
Punjab	582,455	125,228	99·03	75·91	458,755	94,647	2,655	1,04,112	0 2 7
North-West Frontier Province	76,349	14,506	99·22	88·18	46,142	17,845	2,748§	12,200	0 2 3
Ajmer-Merwara	13,880	695	97·94	63·19	10,455	2,828	972	3,034	0 3 3
Central Provinces and Berar	524,599	74,648	98·41	76·36	400,257	96,082	1,997	67,930	0 1 11
Bombay	596,663	40,985	96·76	75·86	430,489	93,075	1,477	2,93,041	0 8 6
Coorg	8,540	2,510	93·52	79·19	754	4,175	1,211	2,773	0 4 8
Madras	1,503,368	124,480	95·61	76·60	565,429	666,387	1,871‖	2,99,200	0 3 3
Total	8,351,530	818,343	97·65	75·45	4,197,807	3,167,152	1,480	1,390,087	0 2 7

* Excluding those the results of which were not known.
‖ Excludes average of work done by medical subordinates.
§ Including the vaccinations performed in Cantonments and Political Agencies.
† Excludes 20,169 cases. ‡ " 24,651 " } In the Patna and Sonepur States reported too late for the provincial report.

B.—*Vaccination operations performed by the Special and Dispensary Establishments separately, deaths from small-pox, etc., during the official year 1907-08.*

PROVINCE.	Population.	NUMBER OF PERSONS VACCINATED (PRIMARY AND REVACCINATIONS COMBINED).			Ratio of successful vaccinations per 1,000 of population.	Percentage of annual estimated births at 40 per 1,000 of population successfully vaccinated.	DEATHS FROM SMALL-POX.	
		By Special Department.	By Dispensary Staff.	Total.			Number.	Ratio per 1,000 of population.
Burma	10,477,508	387,402	19,131	406,533	31·90	19·71	12,882	·34
Eastern Bengal and Assam	30,388,134	1,338,476	20,168	1,358,644	42·20	30·76	8,693	·29
Bengal	51,075,829	1,882,604†	130,947	2,013,551†	37·98	42·39	29,066	·57
United Provinces of Agra and Oudh	47,960,667‡	1,700,697	1,442	1,702,139	33·78	49·94	22,643	·47
Punjab	20,293,834	706,304	1,379	707,683	31·57	56·52	18,082	·53
North-West Frontier Province	2,022,252	90,685	170	90,855	41·98	57·64	5,769	·49
Ajmer-Merwara	476,912	14,575	...	14,575	29·48	54·81	497	1·04
Central Provinces and Berar	13,621,559	575,223	24,024	599,247	42·66	23·46	3,826	·32
Bombay	21,438,769	636,068§	1,580	637,648§	25·89	50·20	1,862	·10
Coorg	189,607	10,904	246	11,150	53·74	10·44	211	1·17
Madras	38,227,818	1,627,690	158	1,627,848	36·61	36·98	22,455	·6
Total	236,565,889	8,970,628	199,245	9,169,873	36·67	41·36	103,988	·46

* For the calendar year.
‡ Includes 16,010 persons enumerated at the Ajodhya Fair.
† Excludes 44,820 operations in the Patna and Sonepur States received too late for inclusion in the provincial report.
§ Including 811 secondary operations.

REPORT

on

SANITARY MEASURES IN INDIA

in

1908-1909.

VOL. XLII.

Presented to both Houses of Parliament by Command of His Majesty.

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REPORT.

The following Report on Sanitary Measures in India in 1908-1909 is prepared for presentation to Parliament. It deals with the health of the European and Native troops, of prisoners in jails, and of the general population; also with vaccination, medical institutions including hospitals, dispensaries and medical schools, with lunatic asylums, and with sanitation.

I.—EUROPEAN ARMY.

Sickness and mortality in 1908.—In many parts of India during 1908 the monsoon rainfall was abnormal in both quantity and distribution, and cholera, malaria, and dysentery were unusually prevalent among the general population. As regards the health of the European troops the rates of admission to hospital and of mortality were higher than those of 1907. The increased sickness and mortality fell entirely upon the troops of the Northern army and was due chiefly to the greater prevalence of malaria; but, excepting venereal diseases, nearly all the more important diseases were more prevalent than in 1907. There was a remarkable fall in the rate of invaliding; this was due partly to the healthiness of 1907, but chiefly to the action taken to ensure that only those men should be invalided who were not likely to recover their health by a change to one of the hill stations in India.

The following table shows the rates of sickness, mortality and invaliding among European troops in the Northern and Southern armies and in India as a whole during 1908 and 1907:—

Armies.		Average annual strength.	Ratio per 1,000 of average annual strength.				
			Admissions.	Constantly sick.	Deaths.	Invaliding.	Total loss.
Northern	1908	36,676	939	49	10·72	16	27
	1907	36,551	744	46	8·34	22	30
Southern	1908	30,243	724	44	7·51	16	24
	1907	31,026	786	50	8·32	31	39
India	1908	68,933	840	46	9·28	16	26
	1907	69,332	756	46	8·18	26	34

It will be seen from this table that the admission, constantly sick and death rates were considerably lower in 1908 among the troops in the Southern than in the Northern army and that as regards the Southern army the rates compare favourably with those in 1907. The statistics relating to Divisions show that during 1908 the troops in the 1st (Peshawar) and 2nd (Rawalpindi) Divisions suffered more severely from sickness and mortality than those in other Divisions and that the troops in the Quetta, Poona, and Secunderabad Divisions suffered least.

The principal causes of death were enteric fever, cholera, and abscess of the liver, the death rates from these diseases being respectively 2·76, 1·10, and ·80 per thousand as compared with rates of 2·73, ·03, and 1·01, in the previous year. More than half the increase in the total death rate as compared with 1907 was due to cholera, a severe outbreak of which occurred among the troops employed with the Mohmand Field Force. The chief causes of invaliding were, in order, tubercle of the lungs, debility, malaria, syphilis, and valvular disease and disordered action of the heart, these together causing 361 invalidings (one-third of the total number) as compared with 811 in 1907. The causes of the decrease in total invalidings have already been mentioned.

The following table shows the rates of sickness and mortality among the European troops arranged according to geographical groups :—

Group.	Average annual strength.	Ratio per 1,000 of average annual strength.		
		Admissions	Constantly sick.	Deaths.
Burma Coast and Bay Islands	1,276	683	48	7·05
Burma Inland	1,751	761	48	9·14
Bengal and Orissa	1,756	844	45	5·69
Gangetic Plain and Chutia Nagpur	6,641	715	40	12·80
Upper Sub-Himalaya	13,428	1,148	57	11·99
North-Western Frontier, Indus Valley, and North-Western Rajputana.	4,894	1,254	53	13·49
South-Eastern Rajputana, Central India and Gujarat.	3,528	1,007	44	9·41
Deccan	10,288	668	40	7·78
Western Coast	1,485	703	51	10·10
Southern India	3,671	762	55	6·27
Hill stations	10,923	575	35	5·68
Hill Convalescent Depots and Sanitaria	3,812	754	65	9·44
India ...	68,933	840	46	9·78

The admission and death rates recorded in four of the above twelve groups were higher than those for the European army as a whole. The groups which include the North-West Frontier Province and the Punjab were the most unhealthy for European troops during 1908 and the Hill stations were, as usual, the most healthy. As regards cantonments, 22 were regarded as having been especially unhealthy during 1908 as compared with only seven in the previous year.

Fevers.—Malaria ranked first in the list of causes of admission to hospital, the admission rate rising from 154 per thousand in 1907 to 244 and the number of deaths from 14 to 35. The admission rate among troops in the Northern Army rose from 161 to 313 and among those in the Southern Army from 147 to 164. Omitting stations with an average strength below 200 the highest admission rates were recorded at Delhi, Meerut, Agra, Ferozepore, Multan, Peshawar, and Hyderabad, the rates in all these being above 612 per thousand. A striking feature of the statistics of malaria among European troops in India is the lowness of the recorded rates in recent as compared with early years. The reduction is common to a large number of stations and is due in great part to changes in diagnostic procedure and in the method of statistical record. There are in addition certain measures which in the opinion of nearly all medical officers have produced a real diminution in the amount of sickness and disability caused by malaria, the most important being: (1) the "after treatment" now given to patients who have been admitted to hospital with malaria, (2) the prophylactic use of quinine, (3) the retention of regiments in hill stations until the worst period of the malaria season in the plains is over. Operations against mosquitoes by such measures as can be accomplished by "mosquito brigades" have now been practised for several years in nearly all stations in the plains, but it is the general opinion of medical officers that by limited measures of this nature an appreciable reduction of the number of malaria-carrying mosquitoes is not produced. In one or two stations measures of a more extensive kind have been undertaken, notably in Lahore Cantonment, in regard to which the results obtained are being examined by a Committee appointed by the Government of India at the instance of the Secretary of State.

The admissions for *enteric fever* were 1,001 or 14·5 per thousand of strength, as compared with 910 or 13·1 per thousand in 1907, and the deaths were 190 or 2·75

per thousand against 192 or 2·77. The average number constantly sick was less by about 16 than in 1907 and the total loss of service due to the disease was less by 5,542 days. The prevalence and mortality were higher among troops in the Northern than in the Southern army and the incidence was greatest among troops in the Peshawar and Rawalpindi Divisions. As regards the stations with an average annual strength of over 1,000 the highest death rates were 8·85 in Jhansi, 7·51 in Cawnpore, and 7·21 in Peshawar. Great attention is given in India to preventing the spread of the disease by "bacillus-carriers", and two depots, one at Naini Tal, the other at Wellington, have been established for the reception and bacteriological examination of convalescents. The Naini Tal depot was opened in April 1908 and received up to the end of the year 310 convalescents, of whom 190 underwent the bacteriological examinations necessary for the detection of carriers and 120 remained to be examined. Among the 190 men examined two were found to be excreting the bacilli six months after their attack, one eight months, one twelve months, one sixteen months and one eighteen months. Five of these men were invalided to England during the year and one remained at the depot. In England the Army Medical Advisory Board appointed a Committee to investigate the best methods of treating the bacillus-carriers invalided from India.

Venereal diseases.—Venereal diseases were the cause of 8·3 per cent of the total sickness during 1908 and of 6·9 per cent of the total invalidings. The admission rate per thousand was 69·6 as compared with 89·9 in 1907, the admissions being less by 1,435 than in that year and the total number constantly sick being less by 129. The causes of the rapid and steady fall in the rates for these diseases, which has formed so remarkable a feature of the health statistics of European troops in India during recent years, have been mentioned in several previous reports. The indication of the decline in syphilis afforded by the figures of the "syphilis register" continues to be satisfactory. Venereal diseases are always less prevalent among troops serving in the north of India than among those serving in the south, and in 1908 the admission rate in the Northern army was only 58 per thousand as compared with 84 in the Southern army. As regards Divisions the admission rates were, as usual, highest among troops in the Burma and Secunderabad Divisions. Excluding stations at which the average strength was below 100 the highest admission rates were recorded as regards the Northern army at Fort William, Delhi, and Fyzabad, and as regards the Southern army at Madras, Mandalay, and Shwebo. The total loss of service involved by these diseases amounted to 221,844 days, which is less by 46,530 than in 1907. The deaths numbered three and the invalidings 74 against 3 and 97 respectively in the previous year.

Abscess of the liver.—Abscess of the liver was considerably less prevalent during 1908, the number of admissions to hospital being 115 and the deaths 55 against 165 and 70 respectively in 1907. The disease caused more admissions and deaths in the Northern than in the Southern army.

Other diseases.—Cholera was unusually prevalent among the general population of India during 1908 and 93 cases with 76 deaths occurred among the European troops. Of these cases 50 were among the troops of the Mohmand Field Force. The remaining cases were distributed over 17 stations. *Small-pox* caused 53 admissions to hospital and two deaths as against 30 admissions and one death in 1907. The admission and death rates from *dysentery* rose from 11·7 and ·33 per thousand in 1907 to 14·4 and ·42. The disease was more prevalent and fatal in the Southern than in the Northern army. *Plague* caused only two admissions to hospital, one of the cases being fatal. There were 93 cases of *tubercle of the lungs* with 16 deaths as compared with 114 and 14 in 1907. The number of men invalided for this cause fell from 107 in 1907 to 73 in 1908.

Invaliding.—The loss by invaliding during 1908 amounted to 1,078 men, equal to 15·64 per thousand of strength against 1,768 or 25·50 per thousand in 1907. In the Northern army the rate was 16·06 and in the Southern army it was 16·17. The practice of sending men, who under the procedure of a few years ago would have been invalided to England, to one of the hill stations in India has been the chief factor in reducing the invaliding rate among European troops. The chief diseases for which invaliding was necessary have already been mentioned. Of the total number of men invalided 82 per cent were under 30 years of age, and 70 per cent had been less than five years in India.

II.—NATIVE ARMY.

Sickness and mortality in 1908.—The health statistics of the Native army during 1908, while being more favourable than those of European troops, were not quite so satisfactory as in 1907, when the rates of constantly sick, of invaliding, and of mortality were the lowest on record.

The following table shows the rates of sickness and mortality in 1908 and 1907.

Armies.		Average strength.	Ratio per 1,000 of average strength.		
			Admissions.	Constantly sick.	Deaths.
Northern Army	1908	62,141	797	26	8·69
	1907	61,163	712	24	7·28
Southern Army	1908	50,822	599	21	6·30
	1907	50,484	584	21	5·68
India	1908	126,975	674	23	7·41
	1907	126,392	629	22	6·27

The death rates shown in this table do not include the mortality among men who died while on sick leave or on furlough at their homes. It will be seen that in 1908 all the rates were considerably higher in the Northern than in the Southern army and that as compared with 1907 the rates in both armies were less favourable than in that year.

The following statement gives for 1908 the chief statistics of the Native army arranged in geographical groups.

Groups.	Average strength.	Ratio per 1,000 of average strength.		
		Admissions.	Constantly sick.	Deaths.
Burma Coast and Bay Islands	1,286	632	19	2·33
Burma Inland	2,823	661	27	4·96
Assam	923	882	23	5·42
Bengal and Orissa	2,219	731	28	6·76
Gangetic Plain and Chutia Nagpur	5,972	664	20	7·87
Upper Sub-Himalaya	21,426	704	23	7·42
North-West Frontier, Indus Valley and North-Western Rajputana	17,733	1,116	32	8·85
South-Eastern Rajputana, Central India and Gujarat	12,114	687	21	5·20
Deccan	17,631	485	19	5·22
Western Coast	1,707	920	34	9·37
South ern India	4,623	561	21	9·30
Hill Stations	23,465	625	23	9·89
India	126,975	674	23	7·41

The chief causes of sickness were malaria, dysentery, respiratory diseases, pyrexia of uncertain origin, and venereal diseases; and the principal causes of death were pneumonia, cholera, malaria, enteric fever, and tubercle of the lungs.

In six of the 12 geographical groups the constantly sick rate was higher than that for the whole Native army and in six groups the death rate was higher. The North-West Frontier and Western Coast groups must be regarded as having been the most unhealthy for Native troops during 1908 but the highest death rate was recorded in the Hill stations group, where pneumonia was the chief cause of death. Among 41 stations in which the average strength of Native troops was over 1,000 the rates of admission to hospital were very high in five, namely Dera Ismail Khan, Edwardesabad, Peshawar, Dehra Dun, and Kohat, and the death rates were high in Abbottabad, Dera Ismail Khan, Peshawar, Lahore Cantonment, and Sialkot.

The average annual strength of Native troops employed with the Bazar Valley and Mohmand Field Forces works out to 1,518 and the rates of admission to hospital and of mortality were 442·0 and 28·99 per thousand respectively. The number of men killed in action or who died from wounds received in action was 36. Wounds and injuries were the chief causes of admission to hospital and of mortality.

Malaria.—The chief cause of sickness in the Native army during 1908 was, as usual, malaria; it accounted for over 39 per cent of total admissions to hospital and the admission rate was 266 per thousand as compared with 225 in 1907. The increase was chiefly among troops of the Northern army but the admission rates recorded in all except two of the twelve geographical groups were higher than in 1907. The rates of admission to hospital for malaria among the Native as among the European troops have declined rapidly during recent years but the practice of treating Native soldiers suffering from malaria as out-patients prevails to so great an extent and varies so much in different years and in the practice of different medical officers that little importance can be attached to the figures.

Pneumonia was, as usual, the chief cause of death in the Native army and contributed nearly 30 per cent of the total deaths, the death rate being 2·20 per thousand of the average annual strength against 1·99 in 1907. The death rate from this disease among the Native soldiers was more than five times higher than among the European.

Other diseases.—In the Native army, as in the European, *cholera* was much more prevalent than in the previous year, 174 cases with 116 deaths being reported compared with 34 and 24 in that year. A case or cases occurred in fifty regiments located in 29 stations. *Small-pox* caused 103 admissions to hospital against 48 during 1907 but the number of deaths from the disease was only three as compared with five. For a number of years it has been the rule that the statistics of this disease among Native troops compare favourably with the statistics among European troops. Prior to 1886 the reverse was invariably the case. From *typhus fever* four admissions and two deaths were recorded as compared with 24 admissions and four deaths in 1907. A considerable increase in the number of cases diagnosed as *enteric fever* in the Native army has occurred during recent years; in 1908 there were 350 cases so diagnosed as compared with 182 in 1907. The increase is partly accounted for by the removal of the heading remittent fever from the list of diseases in the annual returns. The number of cases of *plague* among Native troops fell from 85 in 1907 to 36 and the number of deaths from 56 to 14. *Tubercle of the lungs* caused 378 admissions to hospital and 53 deaths compared with 322 and 42 in 1907 the death rate being ·42 per thousand against ·33 in that year. Among Gurkha troops a noteworthy decline in the prevalence and mortality of this disease has occurred during the last four years. *Dysentery* was more prevalent than in 1907 but the number of deaths was nearly the same. *Venereal diseases* caused an admission rate of 15·2 per thousand against 14·7 in the previous year, the slight increase being confined to troops of the Southern army among whom the diseases were, as usual, more prevalent than among those of the Northern army. The prevalence of venereal diseases among Gurkha troops continues to diminish.

Invaliding.—The number of men invalided for discharge from the service was 842 as compared with 728 in 1907, mainly from tubercle of the lungs, injuries, debility, and malaria.

III.—GENERAL POPULATION.

Meteorology and general conditions.—In 1908 the rainfall was abnormal: in the cold weather it was in excess, but irregularly distributed, in the hot weather it was in defect, except in Upper India, Berar and Mysore, and during the monsoon period although in defect in the eastern parts of Upper India, it was in enormous excess over north-western India.

The condition of the people of India is dominated by the rainfall; and any considerable departure from the normal either in amount or distribution generally sets in motion a train of consequences ending in poverty, sickness, and death. In 1908, as a result of the premature recession of the south-west monsoon of 1907, the spring crops were bad everywhere except in Eastern Bengal and Assam and in Lower Burma, and the autumn crops, although generally good except in Bengal, suffered from the delayed harvesting that was a result of the epidemic of malaria which ravaged Upper India. Poor and belated harvests raised the already high prices of food; and in every province except Eastern Bengal and Assam and Bombay the general mortality was greater than usual, the increase in the death rates being specially noticeable in Upper India. Fortunately the number of deaths from plague decreased very greatly as compared with 1907, but from all causes taken together there were recorded in British territory 253,384 more deaths than in 1907. As a result of the great decline in plague the deaths until the end of May were less by more than half a million than during the corresponding period of the previous year, but in June the increase of cholera and small-pox more than counterbalanced this advantage and after a temporary decline of mortality during August the terrible epidemic of malaria in the United Provinces and the Punjab caused the mortality for the last quarter of the year to exceed that for the last quarter of 1907 by nearly 700,000.

Registration of vital statistics.—The populations among which births and deaths were registered in 1908 numbered 226,409,600, the figures being those of the census of 1901, which become less accurate for purposes of calculation as the date of the census recedes.

Births and deaths.—The mean birth-rate for the year was 37·78 per thousand of the population compared with 37·65 in 1907 and it ranged in the larger provinces between 52·84 in the Central Provinces and 32·4 in Madras. In all provinces except Bengal and the United Provinces the birth rates of 1908 were higher than those of 1907, and in all provinces except Bengal, the United Provinces, the Punjab, and Coorg the births recorded were more numerous than the deaths. The mean death rate was 38·21 compared with 37·18 in 1907; the rates in all provinces except Bombay, the Punjab, the Central Provinces and Coorg were higher than those of 1907. In the different provinces the death rates ranged from 52·73 per thousand in the United Provinces to 26·2 in Madras. In India as a whole the lowest death rate was registered in July and the highest in November. Male and female infants under one year of age died at the rates of 249·64 and 241·40 per thousand born, respectively, the corresponding rates in 1907 having been 221·72 and 209·33.

Chief diseases.—Cholera was present in every province except Ajmer-Merwara, and was severe in Bengal (death rate 5·32 per thousand) and Madras (3·9). The death rate for British territory in India as a whole (2·61 per thousand) has been exceeded only five times during the last 32 years. In 1907 the rate was 1·81 per thousand. Small-pox was also more prevalent than in 1907, especially in Northern India, the death rate rising from ·46 to ·75. Rates over ·5 per thousand were recorded in six provinces. Compared with 1907, there was an enormous reduction in the mortality from plague throughout the country, the most conspicuous falls in the death rates being in the Punjab from 30·57 per thousand to 1·53, in the United Provinces from 6·90 to ·48 and in Bombay from 5·06 to 1·48. The researches of the Plague Research Commission are being carried on continuously. The death rates registered under dysentery and diarrhœa and under respiratory diseases, as usual, varied greatly in different provinces, the variation being due in most cases rather to defect in registration than to the varying prevalence of the diseases. From dysentery and diarrhœa the recorded death rate per thousand of population for British India as a whole was 1·26 against 1·25 in 1907 and from respiratory diseases it was 1·01 compared with 1·00. An enquiry regarding the etiology of dysentery in India is being conducted by officers

of the Central Research Institute, Kasauli. The wave of epidemic malaria which in the autumn of the year swept over certain provinces of India was the chief distinguishing feature of 1908; the recorded death rate from "fevers" in British India as a whole rose from 19·76 in 1907 to 23·96, and in the United Provinces, the Punjab, and Ajmer-Merwara the exceptionally high rates of 41·31, 34·66, and 30·79, respectively, were recorded. Several important enquiries in connection with malaria are being carried on by selected medical officers, and in August 1909 the Government of India addressed the local Governments and Administrations on the subject of a proposal by the Sanitary Commissioner with the Government of India that a permanent organization should be formed to enquire systematically into problems, both practical and scientific, connected with malaria in India. They stated that the Governor-General in Council had decided to convene a Conference to examine the whole question and to draw up a plan of campaign for the consideration of the Government of India and of local Governments. The Conference was opened at Simla on the 12th of October 1909, by His Excellency the Viceroy and Governor-General and meetings were held daily until the 18th. The complete report of the Proceedings has been published separately.

The following table shows the deaths from the chief diseases and from all causes in the several British provinces in 1908:—

Province.	Cholera.		Small-pox.		Fever.		Dysentery and Diarrhœa.		Plague.		Respiratory Diseases.		Deaths from all Causes.		
	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000. 1908.	Ratio per 1,000. 1907.
Bengal	268,908	5·32	35,966	·71	1,184,704	23·44	64,809	1·28	15,948	·31	15,399	·30	1,948,513	38·56	37·72
Eastern Bengal and Assam.	69,329	1·99	9,373	·31	667,146	22·37	24,853	·83	...	...	3,950	·13	916,546	30·74	29·36
United Provinces ...	83,544	1·75	50,996	1·26	1,970,319	41·31	19,388	·41	22,878	·48	20,474	·43	2,514,761	52·73	43·46
Punjab	12,297	0·61	28,682	1·42	697,958	34·66	21,103	1·05	30,708	1·53	64,744	3·22	1,020,485	50·73	62·10
North-West Frontier Province.	2,845	1·49	734	·38	59,795	30·62	320	·17	563	·30	1,857	·97	68,361	35·83	35·12
Central Provinces ..	9,048	0·76	9,044	·75	227,773	18·16	40,760	3·40	6,236	·52	31,902	2·69	457,681	38·12	41·70
Madras Presidency ...	141,979	3·9	22,204	·6	295,834	8·0	60,874	1·7	3,358	·1	27,779	·8	560,919	26·2	24·3
Coorg	114	0·63	38	·21	5,028	27·84	408	2·26	26	·14	21	·12	6,311	34·94	35·15
Bombay Presidency ...	1,759	·09	2,526	·14	243,172	13·12	40,731	2·21	27,445	1·48	54,671	2·96	501,858	27·15	23·89
Lower Burma ...	9,336	1·68	748	·13	33,050	6·63	9,893	1·77	5,169	·93	5,360	·94	156,189	28·06	26·84
Upper Burma ...	2,575	·88	550	·19	24,011	8·23	1,975	·68	2,583	·54	2,370	·81	83,200	28·52	26·13
Ajmer-Merwara ...	...	...	861	1·81	14,682	30·79	727	1·52	74	·15	390	·81	19,093	40·03	39·65
India ...	591,725	2·61	170,694	·75	5,424,372	23·95	285,921	1·26	113,888	·50	227,817	1·01	8,653,097	38·21	37·38

The following remarks relate to separate provinces and cities.

In Bengal a legacy of high prices from the preceding year, defective and irregularly distributed spring rains, and the premature cessation of the monsoon resulted in conditions which were very unfavourable to the public health. The recorded birth rate was 36·09 against 37·70 in 1907 and a quinquennial mean of 38·90. The death rate was 38·56 per thousand compared with 37·72 in 1907. In all the districts of Chota Nagpur, and most of the districts of Orissa and Burdwan the birth rates were exceptionally low and the death rates exceedingly high. In rural areas the mean death rate was 39·06 per thousand compared with 31·20 in the towns, in which it is said improved sanitation is now exercising an appreciable effect.

The cholera mortality rate increased from 4·07 to 5·32 per thousand of population, the number of deaths being, with the exception of the number in 1900, the highest ever recorded. Every district and every town in the province was affected. The disinfection of wells with permanganate of potash was carried out in 19 districts. The death rate from small-pox rose from ·57 to ·71. The increase was confined to rural areas, the number of deaths in towns falling from 3,366 to 2,903. Plague mortality decreased considerably, the rate being ·31 per thousand against 1·65 in 1907. Thirteen of the 33 districts were entirely free from the disease. The recorded death rate from "fevers" rose from 23·18 to 23·44, but there is reason to believe that on the whole malaria was less prevalent than in the previous year. The death rate from dysentery and diarrhœa rose from 1·02 to 1·28.

The birth rate in Calcutta City rose from 19·1 in 1907 to 20·1 and the death rate fell from 37·6 to 32·6. These rates are calculated on the census population of 1901; if calculated on the estimated population in 1908 the death rate for that year would be 28·0 per thousand. The infantile mortality rate as calculated on the number of births registered was 269 per thousand, compared with 293 in the previous year. The number of deaths from cholera during the year was 3,694 of which 3,224 occurred between February and June. Small-pox caused only 578 deaths and plague 1,779 which is the smallest number since 1899. Anti-plague inoculation is offered to the people but it is said that few choose to take advantage of the measure. City and Port of Calcutta.

Altogether 23,434 European seamen arrived in the Port of Calcutta during 1908 against 21,561 in 1907. Of the total deaths four were from cholera. Among the native floating population, which is estimated at 29,768, there were 233 deaths of which 131 were due to cholera.

The cold weather rainfall was in defect in Assam and somewhat above the average in Eastern Bengal; the hot weather rainfall was in defect in both areas. The monsoon was weak and retreated early, and although the rainfall was approximately normal in Assam it was seriously deficient in Eastern Bengal. Prices although lower than in 1907 were higher than normal. The birth rate rose from 37·01 in 1907 to 41·14, all districts sharing in the increase. The death rate was 30·74 compared with 29·30 in 1907 and 31·60 the mean of the previous five years. The rural death rate was 30·92 compared with 22·23 in the towns. Eastern Bengal and Assam.

On tea-gardens the birth rate was 22·7 per thousand compared with 27·6 in the previous year and the registered death rate was 34·3 compared with 29·2.

Cholera was less prevalent in this province than in 1907, the death rate falling from 2·58 per thousand in that year to 1·99. Small-pox caused a death rate of ·31 against ·29 in 1907. In Cachar, the best vaccinated district in the province, only four deaths were recorded. The death rate from "fevers" rose from 21·17 to 22·37, but it is probable that many deaths from cholera were recorded under this heading. No serious outbreak of malaria occurred in any district during the year. Various plans for pushing the sale of quinine have recently been adopted in this province and in one district (Bakerganj) over two million powders were sold during 1908. The death rate from dysentery and diarrhœa rose from ·68 to ·83. The mortality from these diseases is said to have been especially severe on tea estates. Plague was entirely absent from this province during 1908.

Climatic and other conditions were very unfavourable to the health of the inhabitants of the United Provinces in 1908. The monsoon rainfall was irregularly distributed and prices of food grains were exceedingly high throughout the year. In the autumn the provinces were visited by an epidemic of malaria of exceptional severity. The birth rate was 37·46 per thousand, which is 3·72 per thousand less than in 1907 and 5·63 less than the quinquennial mean. The decline was attributed to scarcity and high prices. The death rate reached the figure, unprecedented in these provinces, of 52·73 or 9·27 higher than in 1907 and 12·43 in excess of the quinquennial mean. The death rates in six of the districts were over 70 per thousand. In rural areas the mean mortality was 53·0 per thousand against an urban mean of 49·20, but in some of the towns extraordinarily high rates were recorded, *e.g.*, Kairana 114·53, Shikohabad 93·26, Atrauli 88·28, and Hathras 79·97. United Provinces.

The death rate from cholera increased from ·47 per thousand in 1907 to 1·75. All except 21 of the 105 towns with a population of 10,000 or more were affected. The mortality from small-pox was also much greater than in 1907, but from plague only 22,878 deaths were recorded as compared with 328,862 in that year. The death rate from dysentery and diarrhœa was lower than in any other province except the North-West Frontier. The unusually severe epidemic of malaria in the autumn was the distinguishing feature of the year. The total number of deaths ascribed to "fever" was 1,970,319 and the death rate 41·31 per thousand compared with 28·31 per thousand in 1907. The disease attacked rich and poor and every class alike, but the mortality occurred chiefly among the very young, the very old, and those whose food supply had been limited owing to the high prices prevailing during the two preceding years. About 7,000 lbs. of quinine were distributed gratuitously in the affected districts. Since October 1908 a selected officer has been on special duty for the investigation of malaria in these provinces.

The monsoon was not established in the Punjab until the first week of July, but the rainfall in July and August was greater than the average. The first week of Sep- Punjab.

tember was marked by unprecedentedly heavy rain in the west of the province. Floods were universal, crops were destroyed, and towns were inundated. Houses collapsed and many parts of the country were covered for weeks by sheets of water. These calamities aggravated the existing scarcity and caused almost the highest death rate the Punjab has ever known. The birth rate was 41·8 per thousand, which is 0·8 per thousand less than the quinquennial mean. The death rate was 50·73 per thousand. In all except seven districts the numbers of deaths exceeded the numbers of births.

Cholera, small-pox, and diseases of the bowels and respiratory organs were all more prevalent than usual, but the great cause of death was "fever," from which the recorded death rate was 34·66 compared with 20·16 in 1907. According to Captain Christophers, I.M.S., who was deputed to enquire into the conditions associated with the extraordinary prevalence of the disease, there were two chief epidemic areas, one in the north, involving Gujrat, Gujranwala, and Shahpur, the other in the south-east, involving Gurgaon, Delhi, and parts of Rohtak. Smaller epidemic areas occurred round Ludhiana and Jullundur. Since 1868 there have been nine years in which epidemics of similar character, but sometimes more and sometimes less severe and widespread, have occurred in this province. The heavy floods which accompanied the epidemic in all districts rendered any attempt to deal with breeding-places of mosquitoes impracticable, but measures were promptly taken for the distribution of quinine gratuitously on a large scale, and eight movable hospitals worked continuously in the areas most severely affected. The death rate from plague was only 1·53 per thousand compared with 30·27 per thousand in 1907, when the disease prevailed with unprecedented severity.

North-West Frontier Province.

The autumn rainfall was excessive in Peshawar and Kohat and there was an epidemic of malaria in the autumn, but it began later and ended earlier than the epidemic in the Punjab, and its effects were much less deadly. The birth rate was 37·3, which is 4·8 higher than the rate in 1907. The death rate was 35·8 per thousand compared with 35·1 in 1907. In rural areas the mean death rate was 35·85 compared with 35·59 in the towns.

Mortality in the province was comparatively low in the spring and summer months, excepting May, when there were 775 deaths from cholera. In October and November the mortality from "fevers" was high, particularly in Peshawar. Only 563 deaths were recorded from plague, as compared with 1,547 in the previous year.

Central Provinces and Berar.

In the Central Provinces the winter rains were in defect, but the monsoon broke about the middle of June and gave good rain to every district. In July and August the rainfall was heavy and continuous and the rains did not cease until near the end of September. There was no rain in the last quarter. The price of food grains was high, but the year generally was a healthy one. The birth rate was 52·84 per thousand compared with 52·46 in 1907 and the death rate was 38·12 compared with 41·70. The rural death rate was 38·16 against 37·74 in the towns.

The cholera death rate rose from ·36 per thousand in 1907 to ·76. Of the total number of deaths recorded from this disease 8,790 occurred in the Central Provinces and only 258 in Berar. Small-pox also increased, the number of deaths being 9,044 compared with 3,826 in 1907, but plague caused a death rate of only ·52 per thousand against 3·18 in 1907. The mortality from "fever" was at the rate of 18·16 per thousand against 18 in 1907; it appears that no outbreak of malaria sufficiently serious to require unusual measures occurred during the year.

Madras.

In the Madras Presidency the year was an unfavourable one, for cholera was prevalent in a number of districts and although the monsoon rainfall was practically normal, there was a serious deficiency of rainfall from October to December, the prices of food grains were high, and the effects of scarcity were apparent in the Northern Circars. The birth rate was 32·4 per thousand, which is the highest yet recorded, but the death rate, owing chiefly to the unusual prevalence of cholera, was also high, being 26·2 compared with 24·3 in 1907 and a quinquennial mean of 23·6.

The death rate from cholera was 3·9 per thousand compared with 2·2 in 1907; all the districts in the Presidency were affected and in 18 of them the disease prevailed throughout the year. The death rate from small-pox was the same as in 1907, namely ·6 per thousand, but plague was slightly more prevalent, 3,358 deaths being recorded against 2,872 in that year. The mortality rate from "fevers" was, as usual, much lower than in any of the other chief provinces, being only 8·0 per thousand of the population. The deaths recorded from dysentery and diarrhœa numbered 60,874 as compared with 60,326 in 1907, the death rate, 1·7 per thousand, having remained the same during the last three years.

Madras City

The birth rate in Madras City rose from 38·8 per thousand in 1907 to 39·2. The death rate rose from 40·5 to 43·7. Fevers, dysentery and diarrhœa, respiratory diseases and cholera were the diseases under which most deaths were registered, the mortality from cholera being 1,246 against 691 in 1907. The infantile mortality rate was 296·3 per thousand births against 270·7 in the previous year.

Bombay.

The year was a favourable one in the Bombay Presidency. The birth rate was 35·72 per thousand, the highest since 1899, and the death rate was only 27·15 compared with 32·82 in 1907 and 37·0 the mean of the previous five years.

The death rate from cholera was only ·09 per thousand against ·41 in 1907. Of the 26 districts, twelve were entirely free from the disease and seven others were only slightly affected. Small-pox accounted for 2,526 deaths (·14 per thousand) against 1,862 (·10) in 1907. There was a great fall in the mortality from plague, the rate being only 1·48 per thousand against 5·06 in the previous year. "Fevers" were also less prevalent, the number of deaths being the lowest recorded since 1899. The death rate was 13·17 per thousand compared with 14·09 in 1907. The death rate recorded from dysentery and diarrhœa was 2·21 per thousand against 2·91 in 1907.

City and Port of Bombay.

The birth rate in Bombay City rose from 19·97 to 20·62 and the death rate fell from 39·56 to 39·13 which is lower than in any year of the last decade. The deaths from plague numbered 5,361 against 6,389 in 1907 and fewer deaths were also registered under the heading "fevers." Small-pox and measles were, however, unusually prevalent. The City was comparatively free from cholera until December, when it was imported from Nasik.

In the port of Bombay 235,066 crew and passengers of 2,427 vessels were examined during 1908. The numbers are considerably less than in 1907 on account of the abolition of medical inspection of vessels leaving for coast ports in the Bombay Presidency. The bedding and personal effects of 91,340 persons from outgoing and incoming vessels were disinfected during the year, and 44 ships on which cases of infectious disease had occurred were also disinfected.

Burma.

In Burma the monsoon rainfall of 1908 was normal and favourably distributed, but the rainfall from October until the end of the year was greatly in excess. In Lower Burma the recorded birth rate was 34·06 per thousand compared with 32·65 in 1907, and in Upper Burma the rate was 36·32 compared with 33·14. The death rate in Lower Burma was 28·06 per thousand and in Upper Burma it was 28·52, the corresponding rates in 1907 being 26·84 and 26·13, respectively.

Cholera was more prevalent than in 1907, the mortality rates in Lower and Upper Burma being 1·68 and ·88 per thousand as compared with 1·43 and ·14, respectively, in that year. The prevalence of the disease in all cases was attributed to the contamination and pollution of the sources of water-supply. There was a considerable decrease in the mortality from small-pox, the total number of deaths being 1,298 against 2,882 in 1907 and 8,540 in 1906. The total number of plague deaths fell from 9,249 in 1907 to 6,752. Of the total 5,169 occurred in Lower Burma and 1,582 in Upper Burma. "Fevers" accounted for a death rate of 9·63 per thousand in Lower Burma and 8·23 in Upper Burma, the corresponding figures in 1907 having been 10·28 and 7·53. In some of the districts reputed to be most malarious the registration of vital statistics is not in force. In both Lower and Upper Burma dysentery and diarrhœa caused a higher mortality than in 1907.

Red Sea Pilgrim traffic.

For the pilgrim season 1907-08 all pilgrim ships were thoroughly cleansed and freed from rats by the Clayton process, and the pilgrims were subjected to medical inspection, their clothing and bedding being thoroughly disinfected before embarkation. Twenty-five ships conveyed the pilgrims from Bombay, and the number of pilgrims who undertook the Haj, exceeded 21,760. All the ships were medically inspected at Perim. During the voyage 87 deaths occurred among the Indian pilgrims and during the period of detention at Camaran 63 out of 102 deaths occurred among pilgrims from India. Cholera appeared in Camaran among the pilgrims carried by two of the ships from India. A description of these outbreaks and of their bearing on cholera in the Hejaz will be found on pages 145 to 147 of this volume. The Indian pilgrims returned to Bombay in 24 ships which brought in all 18,351 pilgrims. On the homeward voyage 340 deaths occurred, due chiefly to old age, general debility, privation, pneumonia, dysentery and diarrhœa.

IV.—JAILS.

Sickness and mortality in 1908.—In 1908 all the conditions influencing the health of the prisoners were extraordinarily unfavourable, but in spite of the adverse conditions their health remained fairly good; the admission and constantly sick rates were only slightly higher than the low rates of recent years and although the death rate represents more than a check in the steady fall that has been taking place, it would have been considered a low rate ten years ago. In the jails of India and Burma (excluding the Andamans) the mean daily prison population was 101,336 compared with 93,264 in 1907, the rate of admission to hospital was 646 per thousand compared with 624, the constantly sick rate was 29 compared with 27, and the death rate was 24·17 compared with 17·72. Every administration except Bombay and the North-West Frontier Province shared in the increased mortality.

The following statement shows the sickness and mortality among all classes of prisoners in the jails of the various Provinces for 1908 as compared with 1907:—

Provinces.	1907. Ratio per 1,000 of average strength.			1908. Ratio per 1,000 of average strength.		
	Admissions.	Constantly sick.	Deaths.	Admissions.	Constantly sick.	Deaths.
Burma	256	14	11·88	277	18	13·27
Eastern Bengal and Assam	861	38	29·55	917	37	31·89
Bengal	938	36	10·94	930	38	31·61
United Provinces of Agra and Oudh ...	603	29	15·03	679	31	24·09
Punjab	797	30	19·81	581	26	23·49
North-West Frontier Province	1,209	35	17·75	1,222	37	15·61
Central Provinces and Berar	525	18	19·44	632	21	22·18
Bombay	693	32	20·96	654	33	18·16
Madras	376	19	18·79	443	23	29·80
India excluding Andamans	624	27	17·72	646	29	24·17

Chief diseases.—The diseases which caused the highest rates of admission to hospital were malaria (198 per 1,000), dysentery (77), abscesses, ulcers and boils (65) and diarrhœa (38); and those which caused the highest death rates were dysentery (4·67 per 1,000), tubercle of the lungs (3·76) and pneumonia (3·24). The admission rate from malaria in India and Burma rose from 191 in 1907 to 198 per thousand and the death rate from ·94 to 1·04. Some remarkable results in diminishing the incidence of the disease among prisoners were obtained by the thorough use of quinine prophylactically. The number of cases of dysentery rose from 6,328 in 1907 to 7,796 and the number of deaths from 440 to 473. The disease was especially prevalent and fatal from August until the end of the year. The admission rate from diarrhœa rose from 34 per thousand in 1907 to 38 and the death rate from ·80 to ·94. The admission rate on account of tubercle of the lungs was unusually high (9·4 per 1,000) and the death rate (3·76) was the highest since 1900. Most of those who died had been only a short time in prison. Pneumonia caused an admission rate of 12·4 per thousand against 11·5 in 1907 and a death rate of 3·24 against 2·90. The death rates in the several administrations ranged from 4·91 per thousand in the United Provinces to 1·0 in the Central Provinces. There were 337 cases of cholera and 170 deaths compared with 140 cases and 55 deaths in 1907; and 122 cases of small-pox and 15 deaths compared with 65 and six. The number of cases diagnosed as enteric fever rose from 65 to 113. Plague accounted for only ten cases and five deaths compared with 50 and 30 respectively in the previous year.

Bengal. The effect of the unfavourable conditions of the year upon the health of the jail population of Bengal was enhanced by the serious overcrowding which resulted from a great increase in the number of prisoners, the admissions to jail having risen from 78,891 in 1907 to 101,000 in 1908 and the daily average strength from 14,408 to 15,565. The striking feature of the vital statistics was a great increase of mortality without a corresponding increase in the amount of sickness. The rate of admission to hospital was only 930 per thousand as compared with 938 in 1907 and the incidence of such important causes of sickness as malaria, pneumonia, and respiratory diseases was

considerably diminished, but the death rate rose from 16·94 to 31·61 per thousand. The increased mortality was due almost entirely to the unusually large numbers of deaths from dysentery, tubercle of the lungs, cholera, and anæmia and debility. It appears that the most important causes of the high fatality of these diseases were the serious degree of overcrowding which existed in almost all jails and the fact that as a result of conditions of scarcity or famine the prisoners admitted to a number of jails were broken down in health and very feeble.

Eastern Bengal and Assam. There was overcrowding during part of 1908 in 21 of the 25 jails in this province. The rate of admission to hospital rose from 861 per thousand in 1907 to 917 and the death rate from 29·55 to 31·89, the mortality from all the principal diseases being increased. The admission rate from malaria was 283 per thousand against 257 in 1907 but there were only 9 deaths from the disease against 19 in that year. In the jails as a whole there was a slight decrease in the prevalence of dysentery, but 60 deaths occurred as compared with 53 in 1907 and in some jails such as Noakhali, Rangpur, Mymensingh, Rampur Boalia and Dacca the disease was severely prevalent.

United Provinces. The daily average strength of the prisoners in the United Provinces rose from 23,887 in 1907 to 28,308 and according to the reports of medical superintendents there was overcrowding for periods varying from a few days to the whole year in 36 of the 56 jails in this administration. The rate of admission to hospital rose from 603 per thousand in 1907 to 679 and the death rate from 15·03 to 24·09. There was an increased mortality from all the chief diseases, but it was greatest as regards dysentery, pneumonia, and tubercle of the lungs. During the last five months of the year dysentery caused 880 admissions to hospital and 84 deaths, against 516 admissions and 27 deaths in the same period of 1907. In all the jails pneumonia caused 139 deaths as compared with 82 in 1907. The admission rate from tubercle of the lungs was 8·2 per thousand and the death rate 2·79, as compared with rates of 5·4 and 1·67 in the previous year. Malaria caused 41 per cent. of the total admissions to hospital during the year as compared with 33 per cent in 1,907. The highest rates per thousand for this disease were 1,481 in Mainpuri, 1,203 in Muzaffarnagar, and 1,100 in Bulandshahr.

Punjab. The number of jails in the Punjab was the same as in 1907 and with an increase of about 2,000 in the number of persons imprisoned and a rise in the daily average population from 11,154 to 11,919 there was overcrowding in seven jails. A year characterised by adverse climatic and other conditions is one in which the efforts of medical superintendents to counteract the influence of such conditions can be well tested and as regards the prison population of the Punjab the success attained was noteworthy. The rate of admission to hospital was only 581 per thousand compared with 707 in the previous year and the constantly sick rate only 26 as compared with 30. The deaths, however, numbered 280 as compared with 221, the rates per thousand being 23·49 and 19·81 respectively. This increase was due entirely to the greater prevalence of, and mortality from, tubercle of the lungs, dysentery, and pneumonia. The statistics of malaria show in a remarkable manner the effect of the control exercised by medical superintendents upon the incidence of this disease. In many parts of the Punjab the autumn was the most malarious of which there is record, but, as a result of the thorough manner in which the prophylactic administration of quinine was carried out, the prisoners enjoyed a remarkable immunity, the admission rate being only 164 per thousand as compared with 232 in 1907 and 365 the mean rate for the years 1902—06. Tubercle of the lungs caused 154 admissions to hospital and 70 deaths as compared with 118 admissions and 43 deaths in 1907. Dysentery caused twice as many deaths as in 1907, September and October being the months of greatest prevalence.

North-West Frontier Province. The average strength of the population in the five prisons of this province, during 1908 was 1,345 as compared with 1,183 in the previous year, and all the jails were overcrowded during a part of the year. The rate of admission to hospital was only slightly higher than in 1907 and the death rate was only 15·61 per thuosand, which is less by 2·14 than the rate of that year. Although cholera was prevalent in the province, no case occurred among the prisoners. In the Peshawar jail a small outbreak of typhus fever, causing six cases and one death, occurred in March.

Central Provinces and Berar. With an increase in the average daily strength of the prisoners from 3,241 in 1907 to 4,013 in 1908 there was occasional or continuous overcrowding in 13 of the 21 central and district jails of this administration. The admission, constantly sick, and death rates were all considerably higher than in 1907. Malaria, abscesses, and dysentery were the principal causes of sickness, and dysentery, tubercle of the lungs, and respiratory

diseases the chief causes of death. The admission rate of malaria rose from 160 per thousand in 1907 to 239, and that of dysentery from 34 to 45. Three cases of small-pox occurred during the year, but there was no case of cholera or plague.

Madras. There are now only eight central and six district jails in this administration. The daily average strength rose from 10,166 in 1907 to 10,638 and seven jails were more or less overcrowded during the year. The rate of admission to hospital rose from 376 per thousand in 1907 to 443, and the death rate from 18·79 to 29·80, cholera, dysentery, tubercle of the lungs, and "anæmia and debility" being the diseases which mainly contributed to the greatly increased mortality. Cholera appeared in six jails and accounted for 152 cases and 75 deaths, as compared with 106 and 39 in 1907. Dysentery caused an admission rate of 64 per thousand and a death rate of 7·05 as compared with rates of 57 and 2·85, respectively, in 1907. The death rate from tubercle of the lungs rose from 2·46 to 3·20 per thousand, only five jails being without a death from this disease.

Bombay. The daily average population of the 17 prisons in the Bombay Presidency increased from 7,537 in 1907 to 7,930 in 1908, and seven of the prisons were overcrowded for a considerable part or the whole of the year. The admission and death rates were 654 and 18·16 per thousand as compared with 693 and 20·96 in 1907, the death rate being, with the exception of that in 1905, the lowest on record. There was only one death from cholera during the year and the admission rate from malaria was only 126 per thousand as compared with 178 in 1907. Pneumonia and tubercle of the lungs were, as usual, the principal causes of death, the former disease being most prevalent and fatal among convicts in the Sind gang. Two outbreaks of cerebro-spinal fever occurred in the Hyderabad central prison and caused in all 15 cases with 12 deaths.

Burma. The average daily strength of the jail population was 13,871, as compared with 13,721 in 1907, the rate of admission to hospital was 277 per thousand as compared with 256, and the death rate was 13·27 as compared with 11·88. Abscesses, malaria, and dysentery, were the principal causes of sickness, and tubercle of the lungs, dysentery, and pneumonia the principal causes of death.

Andamans. The conditions in which convicts in the Andamans live render it impossible, under existing arrangements, for the supervision of all matters relating to labour, dieting, and health to be so thorough as in Indian prisons, with the result that the statistics of sickness and mortality among these convicts contrast unfavourably with those of convicts in India. The average strength of the convict population during 1908 was 14,067 or 404 less than in 1907, and there was no overcrowding, except in the hospitals, during the year. The monsoon rainfall was abnormally heavy but it is not apparent that the excess was markedly unfavourable to health for the rate of admission to hospital from all causes was only 1,439 per thousand compared with 1,903 in the previous year, and malarial fevers, pneumonia, respiratory diseases, and scurvy were all considerably less prevalent. The admission rate from dysentery was one per thousand higher than in 1907 and from tubercle of the lungs it was 2·3 per thousand higher. The latter disease caused 100 deaths as compared with 75 in 1907, and to the greater mortality from this disease was due almost entirely the rise in the general death rate from 23·59 per thousand in 1907 to 26·66 in 1908. Dysentery and pneumonia were the other most important causes of death in the Settlement, the former causing 61 deaths and the latter 58, compared with 45 and 62, respectively, in 1907.

V.—VACCINATION.

The total vaccination operations performed in British India by the special department and dispensary staff during the year 1908-09, numbered 9,123,362, showing a decrease of 46,511 compared with 1907-08, but an increase of 43,039 compared with 1906-07. Of the total, 8,161,297 were primary cases and 962,065 revaccinations. Decreases occurred in five provinces, *viz.*, the United Provinces, the Punjab, Burma, Ajmer-Merwara and Coorg; the decrease in the first and last named being 245,354 and 668, respectively. The percentage of success was lower than in the preceding year—primary cases 97·47 against 97·65 and revaccinations 73·44 against 75·45. According to ages 4,106,269 children under one year of age and 3,073,939 between one and six years of age, were successfully vaccinated. The mean proportion of the population protected by the year's operations was 35·93 per thousand of the census population compared with a rate of 36·07 per thousand in 1907-08, the highest ratio being 56·68 in Coorg and the lowest 26·13 in Ajmer-Merwara.

The cost of the special department increased from £92,672 in 1907-08 to £100,702 in 1908-09, every province, except Ajmer-Merwara contributing to the increase. The mean cost of each successful case was $2\frac{5}{8}d$ against $2\frac{7}{12}d$ in the preceding year.

The following statement shows the results of vaccination during the year 1908-09:—

Province.	Population among whom vaccination was carried out.	Number of operations performed (including re-vaccinations) by Special Department and dispensary staff.	Ratio of successful vaccinations per 1,000 of population.	Number of children successfully vaccinated.		Percentage of annual estimated births at 40 per 1,000 of population, successfully vaccinated.
				Under one year of age.	Between one and six years of age.	
Bengal	48,500,325*	2,019,531	39·28	831,786	843,147	43·01
Eastern Bengal and Assam	30,788,134	1,452,260	45·24	377,425	770,543	30·65
United Provinces of Agra and Oudh ...	47,960,667†	1,456,785	28·30	794,130	407,594	41·39
Punjab	20,290,870	668,898	29·32	417,998	74,850	51·49
North-West Frontier Province	2,230,268	91,308	41·86	49,125	17,542	60·49
Central Provinces and Berar	13,621,559	630,647	43·84	419,424	108,911	76·98
Madras	38,227,818	1,649,495	39·19	626,677	590,577	40·98
Coorg	180,607	10,482	56·68	878	4,216	12·15
Bombay	21,438,769	725,772	29·03	470,417	104,887	54·86
Burma	10,477,508	396,413	31·77	88,317	154,678	21·07
Ajmer-Merwara	476,912	12,801	26·13	10,092	1,774	52·90
Total	233,999,437	9,123,362	35·93	4,106,269	3,073,939	43·87

* Excludes 222,045 operations in the Tributary States of Orissa.
† Includes 16,010 persons enumerated at the Ajodhia Fair.

The vaccine lymph depot at Lucknow was closed as it is no longer required, and the vaccine lymph depot at Belgaum, to serve the Bombay Presidency and Sind, was opened during the year under report.

Bengal. There was an increase of 183,205 vaccination operations in *Bengal in 1908-09*, compared with an increase of 21,098 in the previous year: the increase occurred in both primary cases and revaccinations. Of the 34 districts in the province increases were recorded in 25, and of the nine in which decreases occurred, in four only were the numbers considerable: in three of the four districts the prevailing scarcity compelled the labouring classes to leave their homes in search of employment. In primary cases the quality of work was practically the same as in 1907-08, the percentage of success in the two years being 99·34 and 99·32, respectively, but in revaccinations the rate fell to 61·78 from 72·76 the year before. The steady progress in the protection of infants continued, 43·91 per cent on an estimated birth rate of 40 per mille compared with 42·39 per cent in 1907-08, being successfully vaccinated. There was a satisfactory improvement in Puri which had been most backward in vaccination, especially in respect of children under one year of age: parents offered their children for vaccination even in places in which they have always resisted it. Primary operations were conducted with lymph direct from the calf, with lanoline lymph and by the arm-to-arm process, with percentages of success of 99·49, 98·09, and 98·77, respectively. In revaccinations the percentages of success were 76·83, 59·59 and 83·41. The increase in the quantity of lymph manufactured at the Calcutta and Darjeeling depots is said to be evidence of the fact that the arm-to-arm process is being steadily replaced by the use of prepared lymph.

Eastern Bengal and Assam. The improvement in vaccination work in Eastern Bengal and Assam in 1907-08 was continued in 1908-09 when there was an increase of 91,014 operations compared with an increase of 40,612 in the year before. Of 28 districts an increase was recorded in ten. Among the districts showing a decrease was the Naga Hills where the substitution of Angami Nagas, specially trained as vaccinators, for Assamese vaccinators was not acceptable to the people. Further progress was made in the Kamrup district in overcoming the opposition of the Mahapurushyas, and in the Lakhimpur district of extending vaccination among the Muttocks and also among the Miri tribes, 1,289 of the latter having been vaccinated for the first time. The quality of work was better than in the preceding year—primary cases 98·76 per cent successful against 98·23 per cent. and revaccinations 74·26 against 70·21 per cent. Vaccinations at dispensaries continued to decrease owing to the transfer to the regular vaccination staff of areas around dispensaries in certain districts in which vaccinations used to be done by hospital assistants on the staff of hospitals. The quality of the vaccine manufactured at the Shillong depot was on the whole reported to be excellent.

United Provinces. The widespread prevalence of malaria and of famine conditions seriously affected the work of vaccination in the United Provinces, the number of operations falling from 1,702,139 in 1907-08 to 1,456,785 in 1908-09. Of the 50 districts decreases occurred in 40. Of the total, 1,325,443 were primary cases and 131,342 revaccinations, both lower numbers than in the preceding year. The percentage of success was also lower, 96·49 against 97·85 in primary cases and 80·84 against 83·92 in revaccinations. At dispensaries only 765 operations were performed, and although the general unfavourable conditions affected vaccination work at dispensaries, little work is done at any time because children are either vaccinated at their homes or at vaccination stations. The Bovine lymph depot at Patwa Dangar now supplies the whole province and the local depot at Lucknow was therefore closed. The working of the Patwa Dangar depot was satisfactory. Endeavours are being made to replace arm-to-arm vaccinations by the use of calf lymph, but this is to be effected gradually.

Punjab. In the Punjab in 1908-09 there were 38,785 fewer vaccination operation performed than in the previous year being a result of the epidemic of malaria fever in the autumn of 1908. The primary vaccinations were less by 59,368, but the revaccinations more by 20,583. It is said the people generally appreciate vaccination, particularly the first operation but the majority object to revaccination regarding it as unnecessary or a hindrance to work: moreover there is a lack of interest on the part of persons who should co-operate with the vaccinators. To popularise vaccination it is proposed to introduce house to house vaccination. The percentage of success in primary cases fell from 99·03 in 1907-08 to 98·43 in 1908-09, but in revaccinations the rate rose from 75·91 to 76·93 per cent. Vaccine lymph was issued on payment, the measure having been introduced to check demands in excess of requirements.

North-West Frontier Province. There was an increase of 513 vaccination operations in the North-West Frontier Province compared with 1907-08, which is satisfactory after two successive years in which a decrease was recorded, especially as work was hampered by the employment of several vaccinators on cholera duty in the early part of the vaccinating season. Vaccination is becoming more popular with the people partly as a result of the use of glycerinated chloroform lymph. The quality of the work was, however, not as good as in the previous year, the rates of success falling in primary cases from 99·22 to 98·38 per cent. and in revaccinations from 88·18 to 82·14 per cent. Political unrest on the Kurram border and the suspicion of the Trans-border tribes to Government measures to prevent the spread of cholera caused a falling off in vaccination work in the Kurram and Tochi Agencies. In spite of suspicions the people of certain villages across the Kurram border sought later the aid of Government vaccinators on the appearance of an epidemic of small-pox. Vaccination was introduced into the Chitral sub-agency and two Chitralis were trained as vaccinators. The attempt to secure local recruits as vaccinators in the Swat Valley was unsuccessful. Glycerinated chloroform lymph was chiefly used, but owing to a limited supply from the Punjab Vaccine depot, animal and human lymph had to be used in some cases. No inoculation was reported and it is hoped the practice will soon cease altogether in the province.

Including the Feudatory States, there were 40,400 more vaccination operations performed in the Central Provinces and Berar during 1908-09 than in 1907-08. Of the total, 553,438 were primary cases and 86,209 revaccinations, and the percentage of success was 98·78 against 98·41 in 1907-08 in primary cases and 75·66 against 76·36 in revaccinations. Glycerinated lymph was used in the vast majority of the vaccination operations: lanolinated lymph and fresh calf lymph were also used, but to a limited extent. The arm-to-arm method is still occasionally practised in four districts, but the hope is expressed that it will be possible to discontinue it. **Central Provinces and Berar.**

Although the number of vaccination operations in the Madras Presidency increased in 1908-09 by 21,557 cases, the increase was not as great nor as satisfactory as in 1907-08 when it occurred in both classes of work. Primary cases were less than in 1907-08 by 24,597 and revaccinations more by 46,154. The cause at work in districts showing the larger decreases was chiefly the absence of vaccinators without substitutes being provided. In primary cases the percentage of success was practically identical in 1907-08 and 1908-09, *viz.*, 95·6 and 95·5, but in revaccinations the rate rose from 76·6 to 81·4 per cent. There was again a fall in the number of vaccinations performed in municipalities; among the towns showing a decrease was Madras, the decline being attributed to a smaller number of operations at the Natal and Mauritius Emigration depots and at the Penitentiary. Lanoline lymph supplied by the King Institute was chiefly employed with a ratio of success of 95·3 per cent in Local Fund areas and of 99·7 per cent in municipalities. Lanoline lymph unless glycerine lymph was asked for, was supplied from the Institute. Attention was drawn to the fact that owing to the risk of deterioration, vaccinators should use vaccine within a fortnight of the date of issue from the Institute. **Madras.**

There was an increase of 88,124 vaccination operations in the Bombay Presidency in 1908-09 compared with the previous year, which is satisfactory compared with the results of 1905-06 and 1906-07 in both of which years there was a fall and in 1907-08 when the increase was of 7,653 operations only. All districts contributed to the increase in primary cases and in two only did the revaccinations show a fall compared with the preceding year. The percentage of success in primary cases was 96·02, a little below the rate of 96·78 in 1907-08, but in revaccinations the rate fell to 70·65 from 76·86 per cent. The buildings for the vaccine depot at Belgaum were expected to be completed by the commencement of the next vaccinating season when the use of preserved lymph will be extended to the whole Presidency including Sind. Glycerinated lymph was chiefly used: human lymph was also employed and animal lymph in four of the six registration districts. **Bombay.**

In 1908-09 in Burma there were 7,998 fewer primary operations than in 1907-08 and 2,122 fewer revaccinations, showing a total decline of 10,120 operations. Primary cases succeeded at the rate of 93·59 per cent. and revaccinations at the rate of 59·99, both higher rates than in the preceding year. Increases were recorded in 14 districts and decreases in 26, the reasons assigned for the falling off that occurred were such as epidemics of plague and cholera in some districts, the absence of small-pox in others, emigration of people in tracts affected by scarcity, inefficiency among or absence of vaccinators, and passive opposition to vaccination in favour of inoculation. These causes are said to have also affected vaccination work at dispensaries, though this is the first check in the steady increase hitherto recorded. Inoculation is still practised in some districts: under an Act passed during the year inoculation becomes a criminal act in places to which the Act is applied, and this has been done as a beginning in the Hanthawaddy and Pegu districts. An Act was also passed to compel the vaccination of labourers arriving at Rangoon who are unprotected against small-pox, and the Act gives the Rangoon Municipal Committee additional powers to secure the vaccination of the occupants of lodging houses and factories. The vaccine depot at Meiktila continued to supply vaccine to the whole province except the Rangoon Municipality: the greater part of the issues were glycerinated lymph but lanoline and quinated lymph were also issued. The new buildings for the Rangoon Municipal vaccine depot have been completed. **Burma.**

VI.—MEDICAL INSTITUTIONS.

(This section is kind contributed by the Director-General, Indian Medical Service.)

A.—Civil Hospitals and Dispensaries. (*State, Public, Local Fund and Private aided.*)

The hospitals and dispensaries in this class in British India number 2,578, an increase of 78 on the figure for 1907. In many parts of the country there is urgent need of more, but funds are not available, and, except in some of the large towns, the people make very little effort to help themselves by establishing hospitals. The year was marked, in most parts of the country, by unusual prevalence of malaria, and this accounts to a great extent for the marked increase in the number of in-and out-patients. Nearly 27 millions were treated in these institutions, and over a million underwent operative treatment of some sort. The addition of 2¼ million patients has greatly strained the resources of the administration. The great bulk of the income is derived from Government and from local and municipal funds; and in all provinces the lack of support by natives of the country is observable. As the hospitals are improved, more and more patients of the well-to-do classes resort to them for treatment; and the proportion, even of in-patients, who contribute to their own maintenance, is very small. Women and children are coming for treatment in increasing numbers.

The total expenditure on these institutions amounted to Rs. 1,04,69,212 or £697,947; and the sum naturally increases year by year.

The following statement shows the number of hospitals and dispensaries of this class in the several provinces in British India during 1907 and 1908, the number of in-and out-patients treated and of the operations performed—

		Number of Institutions.	Number of In-patients	Number of Out-patients.	Total number of patients.	Number of operations.
1. Eastern Bengal and Assam	1907	338	24,455	3,034,894	3,059,349	75,594
	1908	350	26,246	3,245,167	3,271,413	77,373
2. Bengal	1907	328	38,197	2,694,383	2,732,580	122,788
	1908	331	42,252	2,720,541	2,762,793	133,832
3. Calcutta and Howrah	1907	15	25,689	280,610	306,299	31,383
	1908	15	25,780	290,960	316,740	32,786
4. United Provinces	1907	355	64,597	3,874,006	3,939,603	193,824
	1908	365	60,053	4,010,088	4,070,141	191,180
5. Punjab	1907	282	65,584	3,717,375	3,782,973	189,451
	1908	288	72,492	4,510,157	4,582,649	199,410
6. North-West Frontier Province	1907	41	10,097	565,239	575,336	25,326
	1908	45	10,198	654,763	664,961	25,344
7. Central Provinces and Berar	1907	162	12,431	1,688,056	1,700,487	41,792
	1908	165	13,415	1,717,867	1,731,282	44,671
8. Burma	1907	161	45,548	997,812	1,043,360	27,106
	1908	171	50,274	1,085,744	1,136,018	31,976
9. Madras	1907	485	69,224	5,173,604	5,242,828	184,238
	1908	495	73,911	5,246,431	5,320,342	194,659
10. Bombay	1907	342	50,400	2,133,419	2,183,819	81,723
	1908	322	53,089	2,149,852	2,202,941	82,644
11. Baluchistan	1907	21	3,063	188,936	191,999	4,727
	1908	24	4,218	205,699	210,917	4,981
Total	1907	2,500	409,485	24,349,748	24,759,233	977,362
	1908	2,578	440,928	26,488,269	26,929,197	1,017,356.

The province was healthier throughout the year than usual and the number of cases treated shows only the normal rise under all heads. There were fewer malarial admissions than in 1907. A considerable number of hospital assistants travelled about in malarious districts distributing quinine, and this measure proved a popular one. Part of the medical staff was employed on famine relief works. Bengal.

There was an increase of donations from £8,300 to £11,650 during the year which is unusual and satisfactory. The number of patients who pay for their own food when in hospital is still only 12·76 per cent.

In spite of the healthiness of the year in Bengal the number of cases treated in the Calcutta institutions shows a considerable increase. The Medical College Hospital has been greatly improved, but more accommodation is still required. A new surgical block is to be built. The Presidency General Hospital has also been thoroughly renovated. Maternity cases at the Eden Hospital have increased in number from 771 to 841. A new out-door department will shortly be built at the Howrah General Hospital. Calcutta and Howrah.

The quality of nursing has been criticised, and the matter is under consideration.

Receipts from paying patients have increased, especially at the Presidency General Hospital, where a new ward has been opened for this class.

The operations performed in the Calcutta institutions numbered 33,368 compared with 31,818 in 1907.

Eastern Bengal and Assam. The number of dispensaries increased by 12, and there was a general increase in the number of patients treated and of operations. The Mymensingh female dispensary has been re-opened, with a female hospital assistant in charge, and is attracting patients. The attendance of women has increased by one per cent., and women and female children now represent 21 per cent. of the total patients. The system of affording treatment at fairs and markets is having beneficial results, 110,028 patients having presented themselves as compared with 16,091 in 1907.

United Provinces. There are now 365 as compared with 355 dispensaries in the previous year. There has been a remarkably large increase in the number of out-patients, from 3,875,006 to 4,610,088, nearly three-quarters of a million more than in 1907. This increase is explained by the unusual prevalence of malaria, which accounted for no less than 1,369,583 patients compared with 598,109 in 1907. Even excluding malaria cases the popularity of dispensary treatment is shown by the steady increase of patients for other deseases.

Free distribution of quinine to the extent of nearly 6,000lbs. was carried out at a cost of £4,933. It is considered that in future better arrangements can be made.

The decline of plague has enabled the special establishment to be reduced considerably. Anti-plague inoculation has been carried on energetically during the year, and the number of operations performed rose from 34,169 in 1907 to 133,258.

There is still a shortage of hospital assistants which must continue as long as they are dissatisfied with their rates of pay. The matter is under consideration.

Punjab. The number of State Public, Local Fund and Aided Institutions has risen from 282 to 288. The Lieutenant-Governor comments on the decline of subscriptions from Indians and the small measure of financial support afforded by the population. The whole province subscribed £1,613 only towards an expenditure of nearly £73,300.

The widespread malaria outbreak was responsible for the very large increase in the number of out-patients; the excess of malaria cases over the number for 1907 was 634,283. Distribution of quinine to the extent of 6,298lbs by various agencies, such as the vaccination and plague staff, and the employment of itinerating hospital assistants, was the means employed to combat the disease.

The decrease in the number of surgical operations performed is ascribed to the prevalence of malaria which prevented persons coming for operative treatment.

A new hospital is under construction at Jullundur, and projects for others elsewhere are under consideration.

The hospitals in charge of lady doctors continue to be much appreciated. Children are being brought for dispensary treatment more freely than formerly.

North-West Frontier Province. There is still urgent need of more dispensaries, but lack of funds limits the possibility of extending the system of medical relief more widely. A large hospital, however, is under construction near the Malakand, subscribed for largely by the Khans of Swat.

There was a large increase in the number of patients suffering from malaria; but the increase is noticeable in the case of all other diseases as well.

Here, as in the Punjab, the decline in subscriptions to the hospitals and the way in which well-to-do persons resort to dispensaries for gratuitous attendance are noteworthy.

The Administrative Medical Officer reports that great difficulty is experienced in obtaining civil assistant surgeons, hospital assistants and compounders as the pay and prospects of these men are not sufficiently attractive; and the medical administration suffers as a result of the shortage in the subordinate personnel.

Central Provinces and Berar. The increase in the number of patients appears about normal; wherever plague occurs there is a tendency to a fall in the number seeking relief as out-patients. Malaria was unusually prevalent. The proportion of adult females treated continues satisfactory, being about one to every three male adults; and female children are brought to hospital more than was formerly the case.

Madras. Ten dispensaries have been added, and there has been a large increase in the number of operations performed, otherwise the figures show the ordinary slight increase of about 28 per 1,000. Libraries of medical books for the benefit of subordinates have

been started in each district. The local fund and municipal midwives attended 32,640 confinements, which shows that this system of affording relief is increasing in popularity.

The increase in the number of patients and of operations performed is normal. It is said that women are taking advantage, to a much greater extent, of the means offered to them for the relief of diseases peculiar to their sex. There is a need for more maternity wards, and for more nursing in the larger hospitals; in other respects the equipment of hospitals is fairly up to date. **Bombay.**

New operating theatres have been added to the Jamsetji Jijibhoy and Ahmednagar hospitals and an extension of the Cowasji Ophthalmic Hospital has been completed. The new Civil Hospital at Karachi has been opened; the provision of a maternity hospital at Ahmedabad is under consideration.

Three new dispensaries have been opened. There was an increase in the number of patients which was partly due to the prevalence of malaria. Muhammdan women are resorting more freely to these institutions, and special accommodation for them has been provided at Quetta. **Baluchistan.**

Ten more dispensaries were opened and there has been a considerable increase in the number of patients. The Burmans are attending hospitals better than formerly; this is especially the case with regard to the women, and may be ascribed to improved accommodation in the hospitals and to the presence of lady doctors in the larger towns. **Burma.**

The Inspector-General again draws attention to the fact that, in spite of all inducements to join the service, the civil hospital assistant branch is below strength, and that the men now composing it are below the standard obtaining in India. The attempt to secure Burman students has not been successful, the pay and prospects not being sufficient to attract them. It is also stated that the hospital buildings are quite unsuited for the purpose for which they are intended and that the equipment is lamentably poor. Of the sum of £ 58,800 spent on buildings in Lower Burma the Rangoon General Hospital absorbed 51,200.

It is intended shortly to open a Pasteur Institute at Maymyo.

B.—Civil Hospitals and Dispensaries. (*State Special, Railway and Private non-aided.*)

In addition to State Public, Local Fund and Private aided institutions there are 656 State Special and Railway and 680 Private non-aided hospitals.

The annexed table shows the principal items of information regarding them :—

Institutions.	In-patients.	Out-patients.	Total.	Operations performed.
State Special and Railway	100,721	1,728,966	1,829,687	40,747
Private non-aided	40,349	5,081,656	5,122,005	121,166
Total 1908 ...	141,070	6,810,622	6,951,692	161,913
„ 1907 ...	129,888	6,013,340	6,143,228	142,194

There has been an all round increase in the numbers for treatment.

As indicated by their names the State Special and Railway hospitals are maintained for special classes of the community, and are financed accordingly. Figures of the income and expenditure of the Private non-aided institutions are not obtainable.

C.—Lunatic Asylums.

The following table shows the strength of the Asylum population in 1908 and the statistics of sickness and mortality.

The daily average strength is practically the same as it was last year, but there has been more sickness, owing to the great prevalence of malaria all over the country.

The proportion of criminal lunatics to the whole shows a further slight increase.

The total cost of the asylums amounted to just 12 lakhs or £80,000; and of this amount Rs. 90,000 or £6,000 were derived from paying patients. The latter source of revenue varies very greatly in extent in different parts of the country: for example in

Burma, where the expenditure is about £9,300, paying patients contribute over £1,500, whereas in the Punjab asylum, which costs £8,800 only £330 are derived from this source.

The value of asylum manufactures continues to rise and now amounts to £3,700. The outturn varies very markedly; in Burma for instance, with an average population of 566 the manufactures are estimated at £860 whereas in the Bombay asylums, with an average population of 971, their value is only £187. In Central asylums the facilities for manufacture are larger than in District institutions.

Administration.	Admitted and re-admitted during 1908.	Total Asylum Population. Male.	Female.	Total.	Discharged cured.	Died.	Daily average strength.	Daily average sick.	Number of criminal lunatics.
Bengal	187	834	205	1,039	65	65	851·33	101·31	497
Eastern Bengal and Assam ...	118	498	94	592	52	41	480·33	40·36	294
United Provinces	294	1,132	349	1,481	129	151	1146·07	113·53	230
Punjab	217	674	153	827	69	73	627·34	47·31	164
Burma	218	655	95	750	43	42	560·14	22·37	381
Central Provinces	89	304	87	391	38	40	311·47	35·51	90
Bombay	367	1,049	277	1,326	153	86	971·4	28·9	200
Madras	225	628	213	841	84	58	636·93	60·83	184
Total ... {1908	1,715	5,774	1,473	7,247	653	556	5,641·01	450·12	2,060
{1907	1,677	5,630	1,526	7,031	571	571	5,584·68	383·12	2,039

Bengal. There has been a satisfactory decline in the number of cases of bowel complaints and the mortality therefrom. The total death rate (7·63 per cent. of daily average strength) is far lower than in the County and Borough asylums in England, where it was 10·12 in 1907.

The scheme for a central asylum at Ranchi is still under consideration.

Eastern Bengal and Assam. Epidemic dropsy appeared in Dacca, and affected 57 per cent. of the inmates.

There is still overcrowding at Tezpur, but additional accommodation will shortly be available. The Inspector-General considers a Central Asylum will have to be built sooner or later.

United Provinces. The high death rate from phthisis at Bareilly shows the necessity for special accommodation, and a special block will be constructed shortly for tuberculous cases.

At Agra the inmates suffered much from malaria, and the general health was very poor in consequence.

Punjab. A large hospital for 150 patients is under construction and will supply an urgent want and reduce the present overcrowding. The death rate for the year fell from 17·59 to 11·64 per cent, but there was a great deal of sickness. The Superintendent comments on the great difficulty of getting suitable attendants, and considers that even the recent rise in pay has not afforded sufficient attraction. As it is, a large part of the work of the asylum has to be carried out by criminal lunatics.

Burma. In spite of the institution of a second temporary asylum at Minbu there is still lack of sufficient accommodation, and it will be necessary soon to build a new large asylum. The 'boarding out' of selected lunatics has not proved a success.

Difficulty is experienced in getting a good stamp of warders.

The general health has been good.

Central Provinces. There was slight overcrowding in the Jubbulpore asylum; this will not continue when the extension of the Nagpur asylum enables the whole of the insanes to be accommodated in the latter institution. The year was an unhealthy one and the prevalence of sickness and the mortality were far above the normal.

Bombay. The erection of the new asylum at Yeravada is proceeding satisfactorily; but even when it is built, further extensions will be necessary in some of the local asylums. The average daily number of sick was slight and the mortality very much higher than usual; and the sick rate is far below what obtains in asylums up country. The difficulty of obtaining suitable warders on the present pay is generally felt; a scheme for improving their position is under consideration.

There has been a remarkable decline in the number of deaths, only 58 as compared with 103 in 1907, and 72 in 1906. The general health was good, and there was no overcrowding. The water-supply at Calicut and Vizagapatam is deficient in quantity; the matter is engaging attention. Madras.

D.—Medical Colleges and Schools.

The *Medical College, Calcutta.*—The anatomical museum has been completed; a scheme for a hostel for civil students, estimated to cost £100,000, is under consideration, but it is doubtful if funds will be available for some time. Bengal.

There were 489 male and 20 female students besides the military pupils who numbered 97. Besides these there were 45 pupil nurses and 36 '*Dhais*' under instruction. There was a slight decline in the percentage of successes at the University examinations.

Medical Schools.—The number of pupils in the three schools remains about the same, but the Bengalis represent a still higher proportion of the whole than formerly. The schools at Patna and Cuttack, though intended for Behari and Uriya students, attract fewer of these classes each year.

Additions have been made to the teaching staffs at the Temple and Cuttack schools.

The passed students still show a disinclination to enter the local medical service.

The number of pupils in the two schools (Dacca and Dibrugarh) was 313 compared with 299 in 1907. A special Military class was opened at each to train men for the Indian Subordinate Medical Department, and 21 students entered. Eastern Bengal and Assam.

Agra Medical School.—The total number of students is about the same as in 1907, *i.e.*, 333, of whom 65 are women. The school is popular and more students could be admitted if the accommodation permitted. United Provinces.

Grant Medical College.—The pathological laboratory and operating theatre are nearly completed, as is also the new hostel. A physiological laboratory will be commenced shortly. A new tutorship in Ophthalmology has been created. Bombay.

The number of students on the rolls at the end of the year was 482 against 528 at the beginning. Out of 209 candidates 61 obtained the diploma of L. M. S.

B. J. Medical School, Poona.—New school buildings, and residential quarters are now ready for occupation. There are 132 pupils of whom 73 belong to the Military Hospital Assistant class.

B. J. Medical School, Ahmedabad.—A new hostel has been built to accommodate 42 students. The school however is too crowded; laboratories are urgently needed.

Hyderabad Medical School.—The complaint of inadequacy of the teaching staff is repeated this year. There are only two teachers in addition to the Superintendent.

The new school at Rangoon has failed to attract students and no new ones joined, although the Government monthly stipends have been raised from Rs. 10 to Rs. 40. The Subordinate Medical Department, Burma, does not offer sufficient inducements to the educated classes. Burma.

The school lacks accommodation and this defect would make itself severely felt were it not for the fact of there being only one class.

Medical College.—There were 367 students on the rolls as compared with 357 last year, and of them 26 were women. The latter are now instructed separately in Midwifery and Diseases of women. The new laboratories are not yet ready; it is hoped to add others for pathology and pharmacy. Madras.

There were no students in the Chemist and Druggist department. The results of the post collegiate course for Civil Hospital Assistants have been so satisfactory that it is likely to become a permanent institution.

Tanjore. Prince of Wales' Medical School.—The question of the abolition of this school is still under consideration. The students number 48 only.

Royapuram.—Clinical material is still insufficient for the proper training of the students. More hostel accommodation is required. It is not improbable that the Tanjore school will be merged in the Royapuram school and the latter reorganised.

Punjab. *Lahore Medical College and School.*—The number of students in the College and School, respectively, were 204 and 193. First year students at the Government College are not now shown on the rolls; the reduction in the school attendance is due to the boycott of the Military Hospital Assistant class, for which only 2 instead of 50 competed. The system of training military ward orderlies with a view to breaking the boycott has been discontinued, as it was impossible to get men of this class who could be taught in English.

In the College 39 students went up for the final L. M. S or M. B. examinations and 22 passed; in the final school examination 79 passed out of 81.

A Professor of Pathology and three Assistant Surgeons have been added to the staff. Chairs of Midwifery and Ophthalmology have been sanctioned.

The question of the removal of the school to Amritsar is under consideration.

Indore. The Indore Medical School is supported by the Native States of Central India and supplies hospital assistants for the latter and for some of the Agency hospitals. The school is thoroughly well equipped and administered.

E.—Institutes.

X-Ray Institute of India, Dehra Dun.

In the two classes held during 1908, 35 students passed the prescribed examination, three of whom obtained special "proficiency" certificates. The students included Medical officers of both services (Civil and Military), Assistant Surgeons and Hospital Assistants, as well as one Assistant Surgeon and one Hospital Assistant from Native States. A mechanic was specially deputed from Burma and passed with "proficiency" a modified course, which did not include the application of X-Rays to medicine.

The Divisional apparatus was employed at the base hospitals in connection with the Frontier disturbances during the summer of 1909 and proved to be very efficient in every way. The number of skiagraphic examinations made at the Institute was 903, as against 1,188 in 1907. The reason for this decline in numbers is that comparatively few military cases now require to be sent to the Institute for examination, since the issue of X-Ray sets to Divisions. On the other hand the number of cases of disease sent for treatment has increased from 18 in 1907 to 42 during 1908. There appears to be a growing demand for light treatment in this country, and the addition of a small hospital, together with a few sets of quarters for paying patients will have to be considered.

No case of X-Ray traumatism occurred during the year.

Research Institutes.

Accounts of the Central Research Institute at Kasauli, the Bombay Bacteriological Laboratory, the King Institute, Madras, and the Pasteur Institutes at Kasauli and Coonoor will be found at pages 147 to 151 of this report.

VII.—SANITATION.

Bengal.

The 127 municipalities in Bengal, excluding Calcutta, spent 39·51 per cent of their income during 1907-08 on original or recurring sanitary works, compared with an expenditure of 43·15 per cent in the preceding year. Under the main heads, £89,359 was spent on conservancy, including establishments, road watering, etc., £22,691 on water-supply and £17,921 on drainage. An increase of about £6,330 on conservancy compared with the previous year seems to have been generally distributed, while a decrease of about £5,200 on drainage was due to a reduction in the exceptional expenditure at Howrah. It is said that the efforts of past years to improve health conditions in towns is very perceptible. Progress is slow owing chiefly to the want of funds. Much attention was paid to the working of septic tanks.

The Sanitary Board held five meetings during the year. The principal subjects discussed were, (1) the improvement of sanitary administration; (2) the supervision of the preparation of municipal drainage schemes in the Presidency Division; (3) the construction of a drainage scheme for the Baranagar municipality; and (4) the pay and emoluments of the Assistant Sanitary Engineer.

Calcutta City.

The improvements made in *busties* during the year include about a mile of road, two-thirds of a mile of sewer and half a mile of kerbing and channelling. The progress made shows a falling off as compared with the previous year which is due to the fact that most of the pending cases are approaching completion. Contracts are being let for work in connection with the Overhead Reservoir scheme for the improvement of the filtered water-supply to the City, to which reference was made in last year's report. The machinery at Mullick's Ghat Pumping Station was thoroughly overhauled and new condensers fixed. The construction of the Tolly's Nullah Syphon is in progress. The Maidan Sewer was completed at a total cost of £76,887. A new Lancashire boiler was sanctioned to replace two old locomotive boilers at Mominpur Pumping Station which proved too small for driving centrifugal pumps, and will be put to work before the next rains. The Garden Reach drainage scheme is still incomplete. Work on the sewers for the Canal Area drainage was commenced on the 29th November 1908 and by the end of the year about a ninth of it was completed. The contractors are, however, pushing it on with expedition.

Eastern Bengal and Assam.

Of their total income in 1908 the 44 municipalities in Eastern Bengal and Assam spent 47·94 per cent against 47·04 per cent in 1907, on sanitation. Under the main heads of expenditure, £36,136 was spent on conservancy, including establishment, road watering, etc., £10,343 on water-supply and £2,604 on drainage. Conservancy and water-supply schemes for Dacca are in progress, and a large reclamation, drainage and also a sewage scheme, to cost from £133,333 to £166,667 is being considered.

The Sanitary Board considered several schemes and reported on the proposals for the formation of a provincial sanitary service, the revision of the constitution, functions and powers of the Board and an increase in the number of Deputy Sanitary Commissioners.

United Provinces.

Activity in sanitary matters in the United Provinces was a prominent feature of the year, but as regards municipalities was almost limited to the extension of existing sanitary works and progress with those in course of construction as the cost of projects approved by the Board was only £11,121. During 1907-08, municipalities spent 5¼ per cent of their income on conservancy, plague measures, water-supply and drainage, which includes capital charges which were very high in Mussoorie and Almora. On water-supply in the eight towns with large installations the expenditure was £71,573 and on drainage works the total sum spent was £40,234. Several large schemes were either in progress or are contemplated and the Hathras drainage scheme was completed. The sullage farm at Agra was reported on by a special Committee which found that it was not injurious to the health of the neighbourhood and if properly worked should not cause any nuisance.

The Sanitary Board met three times during the year, the most important matter considered being the scheme for improving the sanitary services.

Punjab.

Municipalities in the Punjab spent 48·54 per cent of their income during 1907-08 on public health and convenience. The main heads of expenditure were £34,413 on water-supplies, £16,713 on drainage, £49,071 on conservancy, road cleaning, watering

and latrines. Among the principal works of sanitary improvement was the Hydro-electric scheme to utilize the water power of the Sutlej to increase the water-supply of Simla and light the station. The Sanitary Board met three times during the year and discussed various schemes of municipal improvement, and also the proposals for improving the sanitary services.

North-West Frontier Province. No new sanitary work of importance was carried out during the year in the North-West Frontier Province, but owing to grants received from Government the municipalities of Peshawar and Dera Ismail Khan were each able to employ an Assistant Surgeon as assistant health officer whose supervision has effected considerable improvement in the sanitation of these towns.

Central Provinces and Berar. The municipalities in the Central Provinces spent 59·47 per cent of their income on sanitation against 42·72 in the previous year. Among the works carried out by the Public Works Department was the extension of the catchment area of the Kalapani tank at Amraoti, and the raising of the dam of the reservoir, the laying of a length of five miles of the 24″ main and extension of the distribution system of the Jubbulpore water-works extension.

The Sanitary Board met at 14 head-quarter towns, the work done under their auspices being mainly in connection with the improvement of village sites and water-supplies.

Madras Presidency. District municipalities in the Madras Presidency spent during the year 1907-08, the following sums under the head Public Health and Convenience, water-supply—capital outlay, £10,545; establishment, £12,095; drainage, capital outlay £2,391; establishment, £2,558, conservancy including roads and plague, £61,216. The allotment by District Boards for sanitation was £69,038 against £55,025 in the previous year. Sanitary progress in most *mofassal* municipalities is said to be slow: in many cases this is due to want of funds, but in others to the councils not displaying any great ability in the management of their affairs. The Public Works Department was carrying out the following major works—water-supplies of Berhampur, Bezwada, Salam, Periyakulam and the extension at Gudiyattam, also the building of a service reservoir at Trichinopoly. The execution of the Ootacamund drainage works and of the Cocanada water works improvement was transferred to the Public Works Department. The Sanitary Engineer carried out works connected with water supplies at Cuddapah, Kumbakonam and Kodambakkam. Government approved the investigation of fifteen schemes, seven for water-supplies and eight for drainage.

The Sanitary Board examined schemes, estimated to cost on the aggregate £48,596, the most important of them being the water-supply of Masulipatam and the extension of the Ootacamund drainage works.

Madras City. As stated in the last report the new Special Engineer took charge of his duties in December 1907, and the department has now been divided into the Water-works and Drainage Sections. Good progress was made in the Water-works Section although work was hampered by the illness of the Assistant Engineer and, in his absence the Special Engineer attended to the duties of the appointment in addition to his own. Contracts of the value of £48,042 were let during the year. A report on "a scheme for the improvement of the water-supply distribution system in the city of Madras" was forwarded to Government in March 1909. A large amount of work connected with drainage was carried out and a number of investigations into the existing drainage resulted in the general conclusion that the whole underground drainage system is in danger of breaking down and improvement of the existing system is a matter of grave urgency.

Bombay Presidency. The income of the 158 municipalities in the Bombay Presidency, excluding Bombay City, in 1908 was £ 532,833 out of which £ 115,718 was spent on improving water-supplies, on drainage and conservancy. There were 25 District Boards and 211 *taluka* Boards with an income of £ 427,070 of which £25,028 was expended on water-supplies and drainage. Among the more important works in progress during the year were the Pundharpur water-supply project and also the drainage project; improvements to the Ahmedabad water-works and extension of the sewerage system; improvement of the Karachi water-supply distribution and extension of the Shone sewerage system. The water-supply works of Dharwar and Hubli were sanctioned and projects

were in preparation for water-supplies to eleven towns and a drainage scheme for one town.

The Sanitary Board held three meetings during the year.

Bombay City.

Satisfactory progress was made with the Malabar Hill Sections sewerage works and the extension of the Low Level Channel No. II from DeLeslie Road to Dadar Road. The engines and pumps at the Love Grove Pumping Station and the machinery at the Colaba Air Compresser Station and the several ejector stations worked satisfactorily throughout the year. The Corporation have sanctioned the conversion of the existing steam driven machinery at the Colaba station into an electrically driven plant. The Tulsi Tunnel repair works commenced in 1904 were finally completed during the year under review. The water-proofing works at the Bhandarwada Reservoir were still in hand. No progress was made with the works sanctioned in July 1907 for improving the storage at the Malabar Hill reservoir which is reported to be due to difficulties in getting suitable tenders.

Burma.

Municipal towns in Burma spent 38·53 per cent. of their income in 1908, on sanitary works, and non-municipal towns 45·18 per cent. The proportion of District Funds and District Cess Funds devoted to sanitation was 7·88 per cent. The local Government made considerable contributions to certain schemes, including grants of £3,467 for regrading the channel of the Shevetachaung Canal at Mandalay and a sum of £ 3,333 each to Mandalay and Prome for the improvement of congested areas. A number of projects were either in process of completion or completed and awaiting sanction.

The Sanitary Board met once during the year and considered the drainage and conservancy schemes for Kyaiklat and questions relating to the improvement of the sanitary services and the functions of the Sanitary Board.

G C. B. P., Simla.—No. 0114 S. C.—23-5-10.—762—N. C.

ABSTRACT OF THE REPORT OF THE SANITARY COMMISSIONER WITH THE GOVERNMENT OF INDIA FOR 1908.

Meteorology of the year.

Summary of the meteorological phenomena of the year.

The following memorandum on the rainfall and other weather conditions of India in 1908 has been furnished by the Meteorological Department of the Government of India:—

CHIEF FEATURES OF THE RAINFALL OF 1908.

I.—The precipitation of the cold weather period was in slight excess when averaged over the whole country, but was somewhat unusual in its distribution. It was materially in defect in Lower Burma, Assam, Kashmir, Baluchistan, Berar, the Konkan, the Bombay Deccan and Hyderabad North; and considerably above the average in the Bay Islands, Orissa, Chota Nagpur, Bihar, the North-West Frontier Province, Sind, Central Provinces East, Hyderabad South, Mysore, and Madras. The excess was largest in actual amount in the North-West Frontier Province, and by percentage comparison with the average in Mysore, where ordinarily but little rain is received.

II.—The rainfall of the hot weather season was below the normal over nearly the whole of the Indian region: the only important exceptions were upper India, Baluchistan, Berar and Mysore.

III.—The commencement of the monsoon rains occurred a few days after the normal date in Bengal and about a week later than usual on the west coast. The currents were very slow in penetrating inland, and as a result the rains in north-west India and Central India were not fully established until nearly the end of the first week of July.

The Arabian Sea current, as measured by its rain-giving capacity, was more vigorous than usual from the second week of July to the 4th September, but was directed to a much greater extent than usual towards north-west India, where accordingly the rainfall was heavy. The Bay monsoon, on the other hand, always showed less than its normal strength and steadiness, particularly in Bihar and the United Provinces East, where the rainfall was light and intermittent.

The total monsoon rainfall was in decided defect over Eastern Bengal, Bihar and the United Provinces East, and very nearly normal or above it over the remainder of the country. The excess was more than 50 per cent over the greater part of north-west India and was absolutely greatest over Rajputana which obtained an aggregate of 33 inches instead of about 20 inches—the normal for the period. The rainfall over north-west India was in fact the heaviest on record.

IV.—The period October to December was unusually dry throughout the country with the exception of Burma, Kashmir and the North-West Frontier Province. The defect was large and serious in Bengal, the Central Provinces, Bombay, Hyderabad and Mysore.

V.—The excess of precipitation recorded during the cold weather and south-west monsoon seasons almost counterbalanced the defect in the other two periods and accordingly the year's rainfall over the whole country was 1 per cent below the normal.

TOTAL RAINFALL OF THE YEAR 1908.

Sub-division.	RAINFALL WHOLE YEAR.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
1. Bay Islands	102·46	96·37	+6·09	+6
2. Lower Burma	127·55	122·86	+4·69	+4
3. Upper Burma	44·08	41·51	+2·57	+6
4. Assam	89·01	99·55	—10·54	—11
5. Eastern Bengal	66·31	85·21	—18·90	—22
6. Bengal	52·74	58·08	—5·34	—9
7. Orissa	57·44	57·73	—0·29	—1
8. Chota Nagpur	47·79	53·40	—5·61	—11
9. Bihar	27·77	49·38	—21·61	—44
10 United Provinces, East	29·86	40·10	—10·24	—26
11. Do. do. West... ...	37·38	38·85	—1·47	—4
12. Punjab, East and North... ...	32·41	23·97	+8·44	+35
13. Punjab, South-west	17·88	8·89	+8·99	+101
14. Kashmir	28·81	27·62	+1·19	+4
15. North-West Frontier Province ...	27·61	16·36	+11·25	+69
16. Baluchistan	6·90	8·25	—1·35	—16
17. Sind	12·18	6·63	+5·55	+84
18. Rajputana, West	26·32	11·81	+14·51	+123
19. Do. East	36·75	25·16	+11·59	+46
20. Gujrat	35·00	35·06	—0·06	0
21. Central India, West	32·64	34·62	—1·98	—6
22. Do. East	51·08	45·65	+5·43	+12
23. Berar	35·07	31·24	+3·83	+12
24. Central Provinces, West ...	46·59	45·65	+0·94	+2
25. Do. East	59·93	52·88	+7·05	+13
26. Konkan	109·13	113·14	—4·01	—4
27. Bombay Deccan	26·78	32·17	—5·39	—17

TOTAL RAINFALL OF THE YEAR 1908.

Sub-division.	Rainfall whole year.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
28. Hyderabad, North	32·87	35·81	—2·94	—8
29. Do. South	34·15	29·72	+4·43	+15
30. Mysore	27·48	34·61	—7·13	—21
31. Malabar	131·24	128·68	+2·56	+2
32. Madras, South-east	30·64	35·66	—5·02	—14
33. Do. Deccan	20·33	24·79	—4·46	—18
34. Do. Coast, North	36·35	40·45	—4·10	—10

THE COLD WEATHER PERIOD, JANUARY AND FEBRUARY.

I.—*General Summary.*—January 1908, unlike the corresponding months of several previous years, was associated with more rain than usual over a very large part of the country. The precipitation was remarkably heavy for the time of the year in Orissa, south Hyderabad, Mysore and the north coast of Madras, which received as much as five to eight times the small normal fall of the month. In February, on the other hand, weather was unusually dry in north-west India and Central India, and very wet in Bengal, the Central Provinces, Mysore and Madras. The distribution of the precipitation of the season was thus very unusual. The aggregate of the period was within 15 per cent of the normal in Eastern Bengal and Assam, the United Provinces, the Punjab, Rajputana, Central India and the Central Provinces, over 40 per cent in excess in Bengal, the North-West Frontier Province, Sind, Hyderabad, Mysore and Madras, and decidedly below the small average quantity in Burma and Bombay.

Weather was even less disturbed in Baluchistan and Kashmir than in the Punjab, and the accumulations of snow on the mountain ranges of these regions at the end of the season were in general below their average depth.

The air was unusually dry in the Punjab, Central India, the Central Provinces and Hyderabad, the percentage of saturation being between 6 and 11 below normal in these areas. The quantity of cloud was very high over north-east India and a large part of the peninsula, and decidedly low in the Punjab and Rajputana.

As is ordinarily the case in a mild winter season the departures of temperature from the normal were nowhere large, except locally in Kashmir and Baluchistan where weather was 3° warmer than usual.

Two cold waves of moderate severity affected northern and central India; the effects of the first lasted from the 9th to the 24th of January, and those of the second from the 1st to the 9th of February. A spell of abnormally warm weather was on the other hand experienced in northwest India from the 10th to the

20th of February : during this period day temperature at times became over 20° in excess in Baluchistan and 18° in Sind.

Burma.—The whole division received less rain than usual, but the deficiency was not large, for the normal fall does not exceed a quarter of an inch in amount. The departures from normal of temperature, humidity and cloud were generally of little significance.

Northeast India, including Orissa.—The precipitation of the period was 26 per cent in defect over Assam, and more or less above the average over the rest of the division. The excess was as much as 75 per cent in Bihar and Chota Nagpur, where it was most marked. Temperature and humidity departed but little from the normal. The amount of cloud was decidedly high, particularly in Eastern Bengal and Assam in spite of the defect of rainfall there.

The United Provinces, Central India and the Central Provinces.—Except in the Central Provinces East where it was in marked excess (+ 160 per cent), and in Berar (which received 79 per cent less than its normal quantity) the total fall of the period was very nearly normal over the division. The air was generally very dry, more especially in the Central Provinces where at some stations the percentage of saturation was from 10 to 17 below normal. Skies were clouded to about the usual extent in most places. Temperature did not differ materially from the average.

Northwest India.—The precipitation was much heavier than usual in Rajputana West, Sind, and the North-West Frontier Province, practically normal in the Punjab, Rajputana East and Gujarat, and in large defect in Kashmir and Baluchistan. The proportion of cloud was very low in the Punjab and Rajputana, while humidity was nearly normal except in the Punjab, where the percentage was 6 in defect, and in Sind where it was 5 in excess. Temperature was higher than usual in Baluchistan and Kashmir, the areas of scanty precipitation, but elsewhere the departures from the average were small in amount.

The Peninsula.—Weather was remarkably wet almost everywhere, the only part where the seasonal rainfall was short of the small normal quantity being the Konkan, the Bombay Deccan and Hyderabad North. The excess was greatest in actual amount in Madras Coast North, and by percentage comparison with the normal in Mysore. The air contained the average amount of moisture except in Hyderabad where it was unusually dry. The quantity of cloud was either equal to or above the normal in most parts of the division. Temperature agreed closely with the normal almost everywhere.*

* Further details will be found in the two following tables, where, as in all the other tables contained in this memorandum, stations at an altitude above sea level greater than 3,200 feet are neglected; exception is made in the divisions of Kashmir and Baluchistan, where stations of all altitudes are included.

Division.	Rainfall, January and February.				Departure from normal of		
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.	Mean temperature.	Relative humidity 8 hrs.	Cloud 8 hrs.
					°		
Burma	0·14	0·26	—0·12	—46	+0·3	0	—0·2
Eastern Bengal and Assam.	1·56	1·77	—0·21	—12	—0·3	+1	+1·1
Bengal	1·79	1·23	+0·56	+46	—1·5	+2	+0·7
United Provinces ...	1·53	1·51	+0·02	+ 1	—0·6	—5	—0·2
Punjab	1·94	2·12	—0·18	— 8	+1·6	—6	—1·0
North-West Frontier Province.	4·31	2·72	+1·59	+58	+0·8	+2	—0·4
Sind	0·77	0·53	+0·24	+45	+0·8	+5	—0·5
Rajputana ...	0·63	0·56	+0·07	+13	+0·2	0	—1·3
Bombay	0·07	0·18	—0·11	—61	—0·3	—3	+0·2
Central India ...	0·85	0·87	—0·02	—2	—0·6	—7	+0·2
Central Provinces ...	0·84	0·75	+0·09	+12	—0·9	—11	+0·1
Hyderabad ...	0·44	0·25	+0·19	+76	—0·4	—10	+0·7
Mysore	0·67	0·11	+0·56	+509	+0·9	+1	+0·5
Madras	1·64	0·86	+0·78	+91	—0·1	0	+0·8
Mean of India when the size of the above areas is taken into account.	1·05	0·90	+0·15	+17	—0·1	—3	0

Sub-division.	Rainfall, January and February.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
1. Bay Islands	2·09	1·15	+0·94	+82
2. Lower Burma	0·05	0·24	—0·19	—79
3. Upper Burma	0·20	0·26	—0·06	—23
4. Assam	1·64	2·23	—0·59	—26
5. Eastern Bengal	1·48	1·29	+0·19	+15
6. Bengal	1·41	1·28	+0·13	+10
7. Orissa	1·44	1·00	+0·44	+44
8. Chota Nagpur	2·22	1·27	+0·95	+75
9. Bihar	2·19	1·25	+0·94	+75
10. United Provinces, East	1·23	1·23	0	0
11. Do. do. West ...	1·89	1·83	+0·06	+3
12. Punjab, East and North... ...	2·16	2·39	—0·23	—10
13. Punjab, South-west	1·11	1·09	+0·02	+2
14. Kashmir	3·92	6·40	—2·48	—39
15. North-West Frontier Province ...	4·31	2·72	+1·59	+58
16. Baluchistan	1·34	2·83	—1·49	—53
17. Sind	0·77	0·53	+0·24	+45
18. Rajputana, West	0·39	0·29	+0·10	+34
19. Do. East	0·73	0·65	+0·08	+12
20. Gujarat	0·17	0·15	+0·02	+13
21. Central India, West	0·59	0·53	+0·06	+11
22. Do. East	1·36	1·50	—0·14	—9
23. Berar	0·11	0·52	—0·41	—79
24. Central Provinces, West ...	0·83	0·93	—0·10	—11
25. Do. do. East... ...	2·21	0·85	+1·36	+160
26. Konkan	0·07	0·18	—0·11	—61
27. Bombay Deccan	0·01	0·19	—0·18	—95
28. Hyderabad, North	0·11	0·24	—0·13	—54
29. Do. South	0·72	0·26	+0·46	+177
30. Mysore	0·67	0·11	+0·56	+509

Sub-division.	Rainfall, January and February.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
31. Malabar	0·54	0·40	+0·14	+35
32. Madras, South-east	2·00	1·21	+0·79	+65
33. Do. Deccan	0·87	0·23	+0·64	+278
34. Do. Coast, North	2·00	0·69	+1·31	+190

The Hot Weather Period, March to May.

H.—*General Summary.*—Meteorologically the hot weather season of 1908 contrasted strongly with the corresponding period of 1907. Weather was drier than usual in March, and the rainfall was scanty and below the normal throughout the country except locally in Madras, Mysore, Central India and the Central Provinces. Indeed over the greater part of northwest India the month was practically rainless. April was very unsettled over upper India, Baluchistan and in a small area in the peninsula, but over the rest of the country the month's precipitation was markedly in defect. May was also drier than usual and the rainfall more or less below the normal over nearly the whole of the country, but more specially in Malabar where it was in large defect. The rainfall of the hot season was thus short of the average all over the country with the exception of the Bay Islands, the Punjab, Kashmir, the North-West Frontier Province, Baluchistan, Berar, Central Provinces West and Mysore; the defect averaged more than 50 per cent in amount in Hyderabad and Bombay.

On the mean of the whole country there was a defect of 25 per cent in the seasonal rainfall, as compared with an excess of 20 per cent in 1907.

As might be expected from the shortness of the rainfall, humidity and the amount of cloud were low in most divisions; the areas of the greatest dryness of the air were the Central Provinces and Hyderabad, where the percentage of saturation was about 8 in defect. The temperature conditions differed but little from the normal, the departures being within 1° of the normal in twelve of the fourteen divisions.

Burma.—The total precipitation of the period was below the average throughout the province, the deficiency averaging 24 per cent in Lower Burma and 23 per cent in Upper Burma. Humidity, cloud and temperature did not differ much from the normal.

Northeast India, including Orissa.—There was less rain than usual in all parts of the division; the proportional defect was greatest (about 50 per cent) in Orissa, Chota Nagpur and Bihar, and least (18 per cent) in Eastern Bengal. The departures of temperature, humidity and cloud were determined by those of rainfall, but were not marked except in the case of Eastern Bengal and Assam where the quantity of cloud was appreciably less than the average.

The United Provinces, Central India and the Central Provinces.—Rainfall was practically normal in the west of Central India and of the Central Provinces, and 34 per cent in excess in Berar; elsewhere there was a defect which was most pronounced in the Central Provinces East where it amounted to 84 per cent. The average amount of cloud was recorded except in Central India where skies were more clouded than usual. The moisture in the air was equal to the normal in Central India and below it in the Central Provinces and the United Provinces. Temperature was approximately normal.

Northwest India.—A large excess was shown in the precipitation over the North-West Frontier Province and Kashmir, and a small excess in the Punjab and Baluchistan, owing mainly to the heavy rain in April. In the rest of the division a defect occurred, ranging from 36 per cent in Rajputana West to 100 per cent in Gujarat. Humidity was low except in Sind and Kashmir, and temperature and cloud were both very nearly normal.

The Peninsula.—Mysore was the only part of the division where the precipitation was above the normal. The shortage exceeded 50 per cent in amount in the Konkan, the Bombay Deccan and Hyderabad, being greatest in Hyderabad South which received only 18 per cent of its normal quantity. On the mean of the period the air was very dry in Hyderabad, the region of largest percentage deficiency of rainfall. The departures of temperature and cloud were generally of no consequence.

Division.	Rainfall, March to May.				Departure from normal of		
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.	Mean temperature.	Relative humidity 8 hrs.	Cloud 8 hrs.
	"	"	"		°		
Burma	8·15	10·65	—2·50	—23	+0·7	0	—0·5
Eastern Bengal and Assam ...	16·91	21·26	—4·35	—20	+1·2	—3	—1·1
Bengal	2·91	5·34	—2·43	—46	+1·1	—4	—0·6
United Provinces	0·60	1·21	—0·61	—50	+1·0	—5	—0·5
Punjab	1·84	1·71	+0·13	+8	—0·4	—6	—0·4
North-West Frontier Province ...	6·45	3·79	+2·66	+70	—1·3	—5	+0·5
Sind	0·22	0·39	—0·17	—44	—0·9	+2	—0·1
Rajputana	0·36	0·65	—0·29	—45	—0·6	—6	—0·5

Division.	Rainfall, March to May.				Departure from normal of		
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.	Mean temperature.	Relative humidity 8 hrs.	Cloud 8 hrs.
	"	"	"		°		
Bombay	0·68	1·58	—0·90	—57	—1·0	—3	—0·5
Central India	0·40	0·54	—0·14	—26	—0·1	—1	+0·9
Central Provinces	0·98	1·18	—0·20	—17	—0·5	—7	0
Hyderabad	0·48	1·86	—1·38	—74	+0·5	—9	+0·3
Mysore	5·73	5·19	+0·54	+10	+0·1	+1	—0·1
Madras	3·48	4·48	—1·00	—22	0	—1	+0·2
Mean of India when the size of the above areas is taken into account.	3·37	4·50	—1·13	—25	+0·1	—4	—0·3

Sub-division.	Rainfall, March to May.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
1. Bay Islands	15·74	15·45	+0·29	+ 2
2. Lower Burma	11·28	14·81	—3·53	—24
3. Upper Burma	5·61	7·24	—1·63	—23
4. Assam	20·99	27·06	—6·07	—22
5. Eastern Bengal...	12·59	15·27	—2·68	—18
6. Bengal	4·41	7·60	—3·19	—42
7. Orissa	2·85	5·77	—2·92	—51
8. Chota Nagpur	2·08	3·91	—1·83	—47
9. Bihar	1·64	3·12	—1·48	—47
10. United Provinces, East	0·46	1·12	—0·66	—59
11. Do. do. West	0·76	1·31	—0·55	—42

Sub-division.	Rainfall, March to May.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
12. Punjab, East and North	1·84	1·82	+0·02	+ 1
13. Punjab, South-west	1·91	1·29	+0·62	+48
14. Kashmir	8·45	6·88	+1·57	+23
15. North-West Frontier Province ...	6·45	3·79	+2·66	+70
16. Baluchistan	2·00	1·80	+0·20	+11
17. Sind	0·22	0·39	—0·17	—44
18. Rajputana, West	0·28	0·44	—0·16	—36
19. Do. East	0·39	0·74	—0·35	—47
20. Gujarat	0	0·27	—0·27	—100
21. Central India, West	0·36	0·42	—0·06	—14
22. Do. do. East	0·44	0·79	—0·35	—44
23. Berar	1·31	0·98	+0·33	+34
24. Central Provinces, West	1·01	0·97	+0·04	+ 4
25. Do. do. East	0·29	1·84	—1·55	—84
26. Konkan	0·70	1·98	—1·28	—65
27. Bombay Deccan	1·12	2·31	—1·19	—52
28. Hyderabad, North	0·57	1·50	—0·93	—62
29. Do. South	0·39	2·15	—1·76	—82
30. Mysore	5·73	5·19	+0·54	+10
31. Malabar	7·68	10·55	—2·87	—27
32. Madras, South-east	4·00	4·55	—0·55	—12
33. Do. Deccan	2·08	2·51	—0·43	—17
34. Do. Coast, North	2·01	3·42	—1·41	—41

The South-West Monsoon Period, June to September.

III.—*General Summary.*—The monsoon currents were somewhat late in arrival in the coast districts, particularly on the west coast, and very slow in extending into the interior, with the result that in Central India and the northwest the establishment of the rains did not occur until about the 7th of July. As

measured by its rain-producing capacity the Bay current was weak throughout practically the whole of the monsoon season, and but seldom extended in full force into Bihar and the east of the United Provinces, where drought conditions prevailed almost incessantly. The Arabian Sea current on the other hand was very active during the greater part of the period from the second week of July to the 4th of September, more especially in northwest India; but after this it declined quickly and by the 10th had ceased to give rain in upper India. During the remainder of September the activity of the current was shown chiefly in the peninsula, where under the influence of a storm from the Bay it gave a deluge of rain which resulted in destructive floods in Hyderabad in the last week of the month.

The rainfall of the whole period June to September was abundant over nearly the whole of the region served by the Arabian Sea current, and was exceptionally heavy over the comparatively dry zone of northwest India. It was on the other hand normal and, on the whole, favourably distributed in Burma, and in slight defect in Eastern Bengal and Assam, Bengal and the United Provinces. The deficiency was large locally in Bihar (45 per cent) and considerable in the United Provinces East and Eastern Bengal (21 per cent). The monsoon rains of 1908 were thus chiefly noteworthy for their abundance in the northwest, and their persistent weakness in parts of northeast India.

The statement below contains monthly data regarding these two features:—

Region of abundant rainfall.	Percentage departure of rainfall.				Region of drought.	Percentage departure of rainfall.			
	June.	July.	August.	September.		June.	July.	August.	September.
Punjab	−72	+38	+148	+21	Eastern Bengal	−19	−8	−52	−10
North-West Frontier Province ...	−62	+57	+289	+283	Bihar	−38	−44	−46	−35
Sind	−83	+248	+25	−106	United Provinces, East ...	−61	−15	+10	−37
Rajputana	−40	+113	+108	−19	.....	...	...	...	...

The excess in northwest India regarded as consisting of the Punjab, the North-West Frontier Province, Sind and Rajputana, is the largest on record, as is shown by the following statement giving data for all years of excess of rainfall:—

Excess of rainfall in northwest India, during rainy season of—

1875	1876	1878	1881	1882	1884	1887	1890	1892	1893	1894	1900	1908
+6·74	+1·41	+3·53	+1·07	+2·13	+2·89	+0·72	+0·05	+6·91	+3·01*	+4·13	+1·92	+8·74

The departures of temperature, humidity and cloud were in the great majority of divisions small in amount and, as is ordinarily the case, were determined, almost entirely by those of the rainfall.

Burma.—The total monsoon rainfall was very nearly normal in amount being 2 per cent in excess in Lower Burma and 5 per cent in defect in Upper Burma. Temperature, humidity and cloud departed but little from the mean.

Northeast India, including Orissa.—The precipitation of the period was almost normal in amount in Assam, Bengal and Chota Nagpur, in slight excess in Orissa, and 21 and 45 per cent in defect in Eastern Bengal and Bihar, respectively. Temperature and humidity agreed closely with the average. The quantity of cloud was very low in Eastern Bengal and Assam, and about normal in Bengal.

The United Provinces, Central India and the Central Provinces.—Rainfall was 22 per cent in defect in the United Provinces East, normal or within 6 per cent of it in the United Provinces West, Central India West and the Central Provinces West, and greater than usual over the rest of the division. The largest excess with respect to the normal occurred in Berar which obtained 24 per cent more than its average supply. The departures of humidity and temperature were generally small in amount. Skies were clouded less than usual in the United Provinces, and to about the average extent elsewhere.

Northwest India.—Rainfall was unusually heavy in this division. The excess ranged from 4 per cent in Gujarat and 9 per cent in Kashmir, to 104 per cent in Sind, 140 per cent in Rajputana West and 142 per cent in the Punjab Southwest. The departures of temperature, humidity and cloud were in general such as are associated with the prevalence of more rainy weather than usual, but were not however large in amount.

The Peninsula.—The rainfall of the period was in excess by 43 per cent in Hyderabad South, 13 per cent in Malabar and 10 per cent in Madras Coast North; in defect by 11 per cent in Mysore; and practically normal over the remainder of the division. On the average of the whole period the temperature and hygrometric conditions did not differ to any important extent from the normal.

Division.	Rainfall June to September.				Departure from normal of		
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.	Mean temperature.	Relative humidity 8 hrs.	Cloud 8 hrs.
	"	"	"		°		
Burma	60·45	60·38	+0·07	0	+0·1	+1	—0·1
Eastern Bengal and Assam.	55·79	63·40	—7·61	— 12	+0·3	—2	—1·6
Bengal	38·77	43·76	—4·99	— 11	+0·4	—1	—0·3
United Provinces ...	30·97	34·99	—4·02	— 11	+0·9	+4	—1·1
Punjab	25·37	16·20	+9·17	+ 57	—1·2	+1	+0·3
North-West Frontier Province.	15·51	8·61	+6·90	+ 80	—1·3	+2	+0·7
Sind	11·19	5·49	+5·70	+104	—0·6	+4	+0·6
Rajputana... ...	32·91	19·68	+13·23	+ 67	—1·9	+4	—0·2
Bombay	42·98	42·38	+0·60	+ 1	—0·3	0	+0·1
Central India ...	37·20	35·39	+1·81	+ 5	+0·6	+1	+0·8
Central Provinces ...	42 60	36·92	+5·68	± 15	+0·1	—2	+0·5
Hyderabad ...	32·54	26·26	+6·28	+ 24	+0·2	—1	+0·7
Mysore	18·34	20·66	—2·32	— 11	—0·1	+1	0
Madras	25·73	24·23	+1·50	+ 6	+0·3	—1	+0·1
Mean of India when the size of the above areas is taken into account.	37·45	35·35	+2·10	+ 6	—0·1	0	—0·1

Sub-division.	Rainfall, June to September.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
1. Bay Islands...	73·58	60·15	+13·43	+ 22
2. Lower Burma	100·76	99·06	+ 1·70	+ 2
3. Upper Burma	26·65	27·95	— 1·30	— 5
4. Assam	62·07	64·06	— 1·99	— 3
5. Eastern Bengal	49·43	62·71	—13·28	— 21
6. Bengal	45·97	44·66	+ 1·31	+ 3
7. Orissa	51·24	44·02	+ 7·22	+ 16
8. Chota Nagpur	42·40	44·92	— 2·52	— 6
9. Bihar	23·08	42·13	—19·05	— 45
10. United Provinces, East ...	27·77	35·44	— 7·67	— 22
11. Do. do. West ...	34·60	34·46	+ 0·14	0
12. Punjab, East and North ...	28·08	18·84	+ 9·24	+ 49
13. Do. South-west	14·83	6·12	+ 8·71	+142
14. Kashmir	12·91	11·82	+ 1·09	+ 9
15. North-West Frontier Province ...	15·51	8·61	+ 6·90	+ 80
16. Baluchistan	2·89	2·10	+ 0·79	+ 38
17. Sind	11·19	5·49	+ 5·70	+104
18. Rajputana, West	25·60	10·67	+14·93	+140
19. Do. East	35·57	22·99	+12·58	+ 55
20. Gujarat	34·79	33·47	+ 1·32	+ 4
21. Central India, West	31·65	32·47	— 0·82	— 3
22. Do. East	48·51	41·04	+ 7·47	+ 18
23. Berar	33·56	27·16	+ 6·40	+ 24
24. Central Provinces, West ...	43·99	41·31	+ 2·68	+ 6
25. Do. do. East ...	56·82	47·47	+ 9·35	+ 20
26. Konkan	107·19	105·55	+ 1·64	+ 2
27. Bombay Deccan	24·77	25·02	— 0·25	— 1
28. Hyderabad, North	32·17	30·16	+ 2·01	+ 7
29. Do. South	32·86	23·01	+ 9·85	+ 43
30. Mysore	18·34	20·66	— 2·32	— 11

Sub-division.	Rainfall, June to September.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
31. Malabar	116·04	102·74	+13·30	+ 13
32. Madras, South-east	10·91	11·87	— 0·96	— 8
33. Do. Deccan	14·79	14·67	+ 0·12	+ 1
34. Do. Coast, North ...	26·76	24·34	+ 2·42	+ 10

THE RETREATING MONSOON PERIOD, OCTOBER TO DECEMBER.

IV.—*General Summary.*—The more striking features of the meteorology of this period were (*a*) the early cessation of the rains over the greater part of northern and central India, (*b*) the persistent feebleness of the Bay current in the peninsula, and (*c*) the feeble commencement of the cold weather rains in Persia and in the plains of northern India.

The rainfall of the whole season was in excess by 83 per cent in Burma, 40 per cent in Kashmir, and 8 per cent in the North-West Frontier Province; it was very scanty in other divisions, more especially in Bengal, the Central Provinces and the greater part of the peninsula, which usually obtain moderate to heavy rain in this period.

As is ordinarily the case during periods of light precipitation, the air was drier and skies less clouded than usual over a large part of the country. A significant exception occurred however in the case of northwest India where, in spite of the defect of rainfall in the plains, the amount of moisture in the air was in excess, owing chiefly to the excessive precipitation of the monsoon period.

Temperature agreed with the normal within 1° in the case of twelve of the fourteen divisions; it was however generally inclined to be low.

Burma.—The seasonal precipitation exceeded the normal by 92 per cent in Upper Burma and by 77 per cent in Lower Burma. The amount of cloud over the division was normal, while the relative humidity was 3 per cent in excess. Temperature was practically normal, the departure being less than 1°.

Northeast India, including Orissa.—Rainfall was generally much short of the normal: the defect was very large in Bengal, Bihar, Orissa and Chota Nagpur which obtained only from 20 to 30 per cent of their respective normal quantities, while Eastern Bengal received a half. Both humidity and cloud were below the average. On the mean of the whole season the temperature conditions did not depart appreciably from the normal.

The United Provinces, Central India and the Central Provinces.—Light rain occurred in the United Provinces, the Central Provinces and Central India East, but in Central India West the weather was dry throughout: normally moderate rain is received in these areas in October. The air was generally drier and skies less clouded than usual. Temperature differed but little from the normal.

Northwest India.—Little or no rainfall occurred in Gujarat, Rajputana, Sind and the Punjab South-west, and only light precipitation in the Punjab East and North and Baluchistan. Weather was on the other hand more disturbed than usual in Kashmir and the North-West Frontier Province in December, and accordingly the total fall of the period was 40 per cent in excess in the former region and normal in the latter. The air was slightly damper than usual in most of the plains districts, and drier in Baluchistan and Kashmir. Skies on the other hand were free from cloud to an unusual extent. Temperature did not depart appreciably from the average except in Rajputana where it was 1⅜° in defect.

The Peninsula.—Rainfall was decidedly below the normal throughout the division: the propostional deficiency was most marked in Hyderabad, the Bombay Deccan, the Konkan, Mysore and the Madras Deccan, which received only 2, 19, 22, 32 and 35 per cent of their respective normal amounts. The cloud proportion was normal or below normal, while humidity was low everywhere. The air was about 1° cooler than usual in Hyderabad, while elsewhere the departures from normal of temperature were small and of no significance.

Division.	Rainfall, October to December.				Departure from normal of		
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.	Mean temperature.	Relative humidity 8 hrs.	Cloud 8 hrs.
	"	"	"		°		
Burma	13·39	7·30	+6·09	+83	—0·6	+3	0
Eastern Bengal and Assam ...	3·57	6·08	—2·51	—41	—0·6	—3	—1·0
Bengal	1·09	4·20	—3·11	—74	—0·8	—7	—0·6
United Provinces	0·27	1·81	—1·54	—85	—0·2	—6	—0·8
Punjab	0·26	0·80	—0·54	—68	—0·5	+4	—0·7
North-West Frontier Province ...	1·34	1·24	+0·10	+ 8	—0·8	+5	—0·9
Sind	0	0·22	—0·22	—100	+0·1	+7	—0·8
Rajputana	0·06	0·68	—0·62	—91	—1·7	+1	—1·0
Bombay	0·67	3·68	—3·01	—82	—0·5	—5	—0·5
Central India	0·25	1·58	—1·33	—84	—0·2	—5	—0·3
Central Provinces	0·46	2·56	—2·10	—82	—0·9	—8	—0·7
Hyderabad	0·10	4·12	—4·02	—98	—1·3	—7	0
Mysore	2·74	8·65	—5·91	—68	+0·6	—6	—1·2
Madras	9·21	14·54	—5·33	—37	—0·4	—4	—0·4
Mean of India when the size of the above areas is taken into account.	2·99	4·44	—1·45	—33	—0·6	—3	—0·6

Sub-division.	Rainfall, October to December.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
1. Bay Islands	11·05	19·62	—8·57	—44
2. Lower Burma	15·46	8·75	+6·71	+77
3. Upper Burma	11·62	6·06	+5·56	+92
4. Assam	4·31	6·20	—1·89	—30
5. Eastern Bengal	2·81	5·94	—3·13	—53
6. Bengal	0·95	4·54	—3·59	—79
7. Orissa	1·91	6·94	—5·03	—72
8. Chota Nagpur	1·09	3·30	—2·21	—67
9. Bihar	0·86	2·88	—2·02	—70
10. United Provinces, East ...	0·40	2·31	—1·91	—83
11. Do. do. West ...	0·13	1·25	—1·12	—90
12. Punjab, East and North ...	0·33	0·92	—0·59	—64
13. Do. South-west	0·03	0·39	—0·36	—92
14. Kashmir	3·53	2·52	+1·01	+40
15. North-West Frontier Province ...	1·34	1·24	+0·10	+8
16. Baluchistan ...	0·67	1·52	—0·85	—56
17. Sind	0	0·22	—0·22	—100
18. Rajputana, West	0·05	0·41	—0·36	—88
19. Do. East	0·06	0·78	—0·72	—92
20. Gujarat	0·04	1·17	—1·13	—97
21. Central India, West	0·04	1·20	—1·16	—97
22. Do. do. East	0·77	2·32	—1·55	—67
23. Berar	0·09	2·58	—2·49	—97
24. Central Provinces, West ...	0·76	2·44	—1·68	—69
25. Do. do. East ...	0·61	2·72	—2·11	—78
26. Konkan	1·17	5·43	—4·26	—78
27. Bombay Deccan	0·88	4·65	—3·77	—81
28. Hyderabad, North	0·02	3·91	—3·89	—99
29. Do. South	0·18	4·30	—4·12	—96

Sub-division.	Rainfall, October to December.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
30. Mysore	2·74	8·65	—5·91	—68
31. Malabar	6·98	14·99	8·01	—53
32. Madras, South-east	13·73	18·03	—4·30	—24
33. Do. Deccan	2·59	7·38	—4·79	—65
34. Do. Coast, North	5·58	12·00	—6·42	—54

European Troops.

(For Statistical Tables, *see* pages 155 to 159).

India.

The average daily strength of the European army of India during 1908, excluding officers, was 68,933. In many parts of the country the monsoon rainfall was abnormal in both quantity and distribution, and cholera, malaria and dysentery were unusually prevalent among the general population. As regards the health of the European troops, it will be seen from the statement in the margin that the rates of admission to hospital and of mortality were higher than those of the previous year. The increased sickness and mortality fell entirely upon the troops of the Northern army and was due chiefly to the greater prevalence of malaria, but, excepting venereal disease, nearly all the more important diseases were more prevalent than in 1907. There was a remarkable fall in the rate of invaliding; this was due partly to the healthiness of 1907, but chiefly to the action taken to ensure that only those men should be invalided who were not likely to recover their health by a change to one of the hill stations in India.

India.	All causes. Ratios per 1,000.		
	1902-06.	1907.	1908.
Admissions ...	939·3	756·4	839·5
Constantly sick ...	57·7	46·4	45·7
Deaths ...	11·72	8·18	9·78
Invalids ...	30·05	25·50	15·64

The principal causes of death were enteric fever, cholera, and abscess of the liver, more than half the increase over the rate in 1907 being due to cholera, which caused 76 deaths as compared with two in that year.

The chief causes of invaliding were, in order, tubercle of the lungs, debility, malaria, syphilis, and valvular disease and disordered action of the heart, these together causing 361 invalidings (one-third of the total number) as compared with 811 in 1907. The causes of the decrease have already been mentioned.

If the marginal tables in the first paragraphs of this and the following section be compared, it will be seen that the admission rate for European troops during 1908 was nearly one and a quarter times as high as that for Native troops and that the constantly sick rate was a little more than twice as high; the invaliding and death rates are not fairly comparable.

The average annual strength of the European troops with the Bazar Valley Field Force, the operations of which lasted from the 13th of February to the 2nd of March 1908, works out to 97, and altogether 45 admissions to hospital and one death were reported. The Mohmand Field Force was employed from the 17th of April to the 2nd of June and the average annual strength works out to 314. Altogether 524 admissions to hospital and 50 deaths occurred, 41 of the deaths being due to a severe outbreak of cholera.

Northern and Southern Armies. Divisions. Stations.

The relative healthiness of the troops comprising the Northern and Southern armies can be ascertained very easily with the aid of Table 1A to this section. The much greater amount of sickness and mortality in the Northern army is noteworthy and from the

statistics in Table II it will be seen that nearly all the principal diseases contributed to the increase. The statistics relating to Divisions (Table I A) show that the troops in the 1st (Peshawar) and 2nd (Rawalpindi) Divisions suffered most and that, as a result chiefly of cholera and enteric fever, the death rates in these two Divisions were very much higher than in 1907. The statistics of troops in the Quetta, Poona, and Secunderabad Divisions were more favourable than in the other Divisions during 1908.

In 1908 no fewer than twenty-two stations, as compared with seven last year, come in the list of those that, according to the statistical method adopted in this report, are to be regarded as having been especially unhealthy. Full abstracts of the sanitary reports on these stations will be found in Table V,* so it is not necessary to do more than draw attention to them here. As regards the prevalence of important diseases in plains stations where the average annual strength was 500 or more, the incidence of enteric fever was greatest at Jubbulpore, Rawalpindi, Peshawar and Sitapur; of malarial fevers at Meerut, Agra, Ferozepore and Multan; of dysentery at Madras, Jubbulpore, Kirkee and Allahabad; and of venereal diseases at Fort William, Madras, Shwebo and Fyzabad.

Geographical groups.

In Tables I (B) and III appended to this report will be found the statistics of European troops arranged according to the geographical areas into which India has been divided from the meteorological point of view. It will be seen that the admission rates were higher than in 1907 in the five areas numbered consecutively IV to VIII, which include the plains of Bengal and Orissa, the United Provinces, the Punjab, the North-West Frontier Province, Sind, Rajputana, and Central India. In all these areas, except the United Provinces, the monsoon rainfall was in excess of the normal, the excess being very great in the South-West of the Punjab, Western Rajputana, Sind and the North-West Frontier Province. The areas numbered VII and VI (which include the North-West Frontier Province and the Punjab) were the most unhealthy for European troops during 1908 and the Hill stations (XIIa) were as usual the most healthy. Malaria, enteric fever, and other fevers were the diseases that caused areas VII and VI to be so unhealthy.

Influenza.

Influenza caused an admission rate of 6·3 per thousand among the European troops as compared with 12·5 per thousand in the previous year and 11·4 in 1906. The disease was confined almost entirely to the troops of the Northern army, those located in group VII (Indus Valley) being affected to the extent of 21 per thousand of their strength. Cases were reported from 32 of the 82 stations for European troops, but in most the number was very small, Peshawar, Sialkot and Meerut being the only stations where the disease prevailed in epidemic form. In Peshawar the disease appeared in February, but most of the cases occurred during August and September. In Sialkot 66 of the 82 cases occurred during July, August and September.

Cholera.

Cholera was unusually prevalent among the general population of India during 1908, and 93 cases with 76 deaths occurred among the European troops. Of these cases, no fewer than fifty were among the troops of the Mohmand Field

* When a Table or appendix is marked with an asterisk it refers to the standard tables or appendices of the Sanitary Commissioner's Annual Report.

Force which was operating in a highly infected area. The Royal Munster Fusiliers suffered severely, 43 cases with 36 deaths occurring in four days. A board of inquiry appointed to investigate the cause of the outbreak in this regiment considered that it was due to the drinking of infected water from wayside sources on the march to Shabkadar. The cases that occurred among troops not of this field force were distributed over seventeen stations of which Cawnpore, Peshawar and Rawalpindi were the only ones with more than four cases.

Small-pox.

Small-pox was also more prevalent in India, and there was an increase in the number of cases among European troops, fifty-three admissions to hospital and two deaths being recorded as compared with thirty admissions and one death in 1907. One or more cases were recorded in twenty stations during 1908; there were fourteen at Lucknow, five at Rawalpindi and five at Fyzabad. Of the two patients who died one had been vaccinated in infancy, but had not been re-vaccinated; the other bore no marks and there was no record of his having been vaccinated.

Malaria.

In a number of stations occupied by troops of the Northern Army during 1908 an unusually heavy monsoon rainfall was followed by a severe prevalence of malaria with the result that among European troops the number of admissions to hospital for this disease rose from 10,632 (154 per thousand) in 1907 to 16,824 (244 per thousand), and the number of deaths from 14 to 35. The troops of the 1st (Peshawar), 7th (Meerut), and 5th (Mhow) Divisions located in the Indus Valley, Upper Sub-Himalaya, Central India and Deccan geographical groups suffered most, but excluding the Hill stations the disease was more prevalent than in 1907 in 39 stations and was less prevalent in only 17. Omitting stations with an average strength below 200, the highest admission rates were recorded at Delhi, Meerut, Agra, Ferozepore, Multan, Peshawar and Hyderabad, the rates in all these being above 612 per thousand.

Remarks based upon the reports of Medical Officers.

Anyone who has before him a table showing for a number of years the admission rates from malaria among European troops in India cannot fail to be struck by the lowness of the rates in recent as compared with early years. The rate for the decennial period ending with 1888, for example, was 485 per thousand, for the decennium ending with 1898 it was 374, and for that ending with 1908 it was only 223. The reduction has been brought about by a diminution in the rates recorded at a large number of stations, the quinquennial rates during the last 30 years in a few of which are shown in the following table—

	Admission rates from malaria per 1,000 of average strength.					
	1879 to 1883.	1884 to 1888.	1889 to 1893.	1894 to 1898.	1899 to 1903.	1904 to 1908.
Ambala	507·4	423·5	222·7	294·6	280·5	118·1
Amritsar	1982·7	1107·8	1407·7	713·3	648·9	259·8
Delhi	2456·8	2395·2	1200·3	1308·7	882·3	707·0
Ferozepore	678·9	718·1	635·3	839·5	835·9	349·2
Karachi	1554·1	511·9	451·3	1273·0	371·5	199·5
Lahore Cantonment ...	1736·2	1232·6	1048·4	937·8	831·5	292·7*
Peshawar	1735·8	750·5	928·4	925·0	384·4	496·7
Rawalpindi	936·3	294·2	418·0	1417·1	240·4	226·6

* In one year (1908) of the period the statistics of Fort Lahore have unavoidably been included.

To review in a detailed manner the many causes to which the reduction might be ascribed would occupy an unreasonable amount of space, but a few remarks are necessary. There are to be considered in the first place the causes by which a statistical reduction might be brought about without a reduction in the prevalence of the disease. An important cause of this kind was introduced when, as a result of Major Ross's discovery, definite operations against mosquitoes were started in nearly every cantonment. The immediate result of these operations was a re-awakening of interest in malaria and especially in its diagnosis. Medical officers who believed that the inevitable outcome of starting a "mosquito brigade" would be an immediate reduction of malaria, unconsciously began to be more careful in diagnosis. The use of the microscope became more frequent and, whereas in former years almost every case of "fever" was diagnosed as malaria, it now became the rule to record many cases under the headings simple continued fever, heat-stroke, debility, and congestion of the liver. In some stations the reluctance to diagnose a case as malaria was so great that no case was so recorded unless parasites were found at the first and only examination of the blood. The change in diagnostic procedure produced a decline in recorded malaria, but at the same time it caused the admission rate from simple continued fever to rise steadily from 14 per thousand in 1902 to 74 per thousand in 1908. Attention was drawn to the matter in the issue of this report for 1906 and an example was given showing that although in seven stations the total admissions from malaria in 1905-06 were less by 2,288 than in 1901-02, the number recorded under simple continued fever was greater by 2,308 so that the total number recorded under both headings was about the same in the two periods. The change in diagnostic procedure was not, however, the only influence tending to lower the admission rates of malaria among European troops in India, for in September 1903 there was introduced the system known as "treatment in barracks", under which patients whose disease is mild are not admitted to hospital, but receive treatment as out-patients, their names not being entered in the returns showing admissions to hospital. During the years 1904 to 1908 no fewer than 25,668 cases of malaria among European troops in India were treated out of hospital* and to this must be ascribed a considerable proportion of the reduction that (as will be seen from the table given above) is so evident in the rates of admission to hospital during the most recent quinquennial period. In view of the effect of these two causes it is difficult to estimate how much of the recorded reduction in malaria is due to a real diminution of prevalence. There are, however, certain measures which in the opinion of nearly all medical officers have produced a real diminution. Of these the most important are; (1) the "after treatment" now given in all stations to patients who have been admitted to hospital with malaria, (2) the prophylactic administration of quinine, (3) the retention of regiments in hill stations until the worst period of the malaria season in the plains is passed. For carrying out the system of "after treatment" nominal rolls of patients who have suffered from malaria are kept in the station hospitals and the patients are required to attend at first daily and afterwards twice weekly for from six weeks to two months to receive a dose of quinine. The treatment has caused a marked decrease in the number of re-admissions for relapses, which are the chief cause of the high admission rates in certain stations. The prophylactic administration of quinine has been carried out for many years in nearly all stations in the plains, but with very varying strictness in different places and at different periods. The arrange-

* In 1908 the number so treated was 6,703 as compared with 4,944 in 1907.

ments adopted have been detailed each year in this report, and as regards 1908 a few words will suffice. The measure was carried out in 53 of the 58 stations in the plains, the dose usually given being 10 grains on two consecutive days weekly. The results reported by medical officers are more conflicting and not so satisfactory as usual, but in not a few stations the unsatisfactory results may, I think, justly be attributed to the lack of strictness with which the administration was carried out. At Rawalpindi the medical officer's previous experience had led him to have little faith in the measure and during 1908 the administration was carried out without medical supervision. The report from Multan contains no mention of the plan adopted for ensuring that the soldiers received the doses. At Allahabad the quinine was distributed by the sergeants of companies. At Cawnpore it was issued under the supervision of a subordinate. At Karachi it is said that the corps of Artillery "being rather distant from the hospital" carried out the quinine parades without medical supervision. Other stations at which the administration was not under medical supervision were Mhow, Nasirabad and Nowgong. It is quite possible, of course, that quinine given in the doses and at the intervals usually recommended may sometimes fail to prevent malaria among European soldiers, but before accepting this view it is necessary to show that reported failures cannot be accounted for by the common reasons that are found to afford an adequate explanation of failures among other classes of people in India. Further remarks on this subject will be found on pages 117 and 118 of this report and on the whole it appears not improbable that as regards reported failures among European troops the distribution of effort over a number of quite dissimilar anti-malarial measures has tended to prevent that concentration of attention upon quinine prophylaxis from which alone successful results by this method can be attained. The practice of keeping regiments in hill stations longer than was customary some years ago and the removal of regiments to camps at some distance from the barracks have certainly tended to diminish the amount of malaria, and it is suggested by several medical officers that these measures should be more widely adopted in very malarious years. Lastly, there are the measures taken to prevent men being bitten by mosquitoes and those taken with the object of destroying mosquitoes. The use of mosquito-curtains is still confined to a few regiments in about nine stations. Operations against mosquitoes by such measures as can be accomplished by mosquito brigades have now been in practice in nearly all stations in the plains for several years. In most stations they are thoroughly carried out, but it is the general opinion of medical officers that by limited measures of this kind an appreciable reduction of the number of anopheline mosquitoes is not produced. In one or two stations measures of a more extensive kind have been undertaken, notably in Lahore Cantonment, in regard to which the results obtained are being examined by a Committee appointed by the Government of India.

Pyrexia of uncertain origin.

In the statistical returns for 1908 the heading "Pyrexia of uncertain origin" appears for the first time and it may be said at once that it has been used by medical officers as a substitute for the heading "simple continued fever" which has been removed from the Nomenclature of Diseases. There were in all 5,096 admissions to hospital recorded under the heading during 1908 which gives an admission rate of 73·9 per thousand, but in addition 1,526 cases were treated "in barracks"; if these are included the incidence rate would be

96·1 per thousand. It appears from the reports of medical officers that a number of the cases were malarial in origin and that a few were cases of dengue. No death was recorded under the heading during the year.

Malta Fever.

Three admissions to hospital during 1908 were due to Malta fever as compared with five in the previous year, seven in 1906, and four in 1905. The cases in 1908 occurred at Sialkot, Barian, and Murree. The source of infection was not discovered in any case and in all the diagnosis was made on the results of the serum test. The patient at Barian was treated for some time as a case of lumbago.

Kala-Azar.

The heading kala-azar appears for the first time in the returns for 1908 and during the year four cases with one death were recorded among European troops. The cases occurred at Madras, Wellington, Jhansi and Jubbulpore. In two of the cases the diagnosis was confirmed by finding the Leishman-Donovan parasites in blood taken from the spleen or liver.

Recent investigations.—[*The yearly summary of literature upon enteric fever and commentary upon recent investigations is omitted from the present abstract.*]

Preventive measures.

The modern method of attempting to reduce the prevalence of typhoid fever—which differs from the old in being essentially a method of attack rather than of defence—has been frequently outlined in previous issues of this report. It is being carried out on a large scale in the campaign on the south-west frontier of the German empire. Kirchner's complete account of this campaign was referred to in last year's summary, and in the literature for the current year Klinger describes the epidemiological findings and results up to 1908. The area under the control of the German Commission includes four towns of considerable size as well as a number of industrial and some very poor agricultural districts, and its population is nearly 2,300,000. Before the campaign was initiated, the number of cases and deaths reported as due to typhoid fever by no means represented accurately the true amount of sickness and death caused by this disease, and it will therefore be difficult for some years to estimate by statistics the full effect of the operations. The following table compiled from statistics given in the article by Klinger shows the figures for the area under the control of the German Commission from 1904 to 1907:—

Year.	Actual numbers.		Ratios per 10,000 of population.	
	Cases.	Deaths.	Cases.	Deaths.
1904	2,567	235	11·2	1·02
1905	2,052	215	8·9	·94
1906	2,080	220	9·1	·96
1907	1,787	189	7·8	·82

As regards the separate statistics for the 31 circles in the area a considerable fall in the number of cases occurred in 21 circles and no fall or a rise in nine. Klinger expresses the opinion that, considering the statistics refer chiefly to a period when the organisation is being built up and perfected, the belief is justifiable that great success will ultimately be attained. The epidemiological findings were of great interest and showed the difficulties which attend an attempt to reduce the prevalence of the disease among the civil population in so wide an area. During 1906 and 1907, the source and vehicle of infection were definitely discovered in only 36 per cent. of all the cases that occurred. This 36 per cent. represented a total of 1,397 cases, and in no fewer than 1,272 of these the source of infection was a person actually suffering from the disease, only 125 of the cases being traced to healthy bacillus-carriers. The large part played by the former class of persons in the spread of the disease was attributed by Klinger to their great number in comparison with the number of healthy carriers and to the higher virulence of the bacilli excreted by such patients. One of the chief difficulties was that of discovering cases at a sufficiently early stage of the disease to prevent new infections being caused by them, and on account of this difficulty it happened that of the 1,397 cases in which the source of origin was discovered no fewer than 912 were referable to patients before the time when they came under control. During the investigations, 431 healthy bacillus-carriers were found, and of these 211 excreted the bacilli for less than three months and 220 longer than this. In regard to the mode of spread, direct contact played by far the greatest part, infection by the hands alone being traceable 1,315 times as compared with only 59 times in which the vehicle was found to be milk, 22 times in which it was found to be contaminated food, and twice in which it was found to be water.

Enteric fever. Reports by medical officers.

As usual the reports upon enteric fever by medical officers in charge of station hospitals are concerned largely with accounts of the enquiries made with the object of ascertaining the source and mode of infection, and as usual the enquiries failed in the great majority of instances to yield a definite result. The failure is generally due to the difficulties that always attend an enquiry into the origin of cases occurring at intervals of some days and often of some weeks, but it may not be out of place to remark upon the possibility that the well-worn phrase "the source of infection could not be traced" would appear less frequently in the reports if in the conduct of the enquiries more attention were directed to the line of investigation that recent advances in knowledge of the epidemiology of enteric fever have shown to be all-important. With a number of noteworthy exceptions, to which reference will presently be made, the tendency to be content with an endeavour to ascertain the particular *vehicle* by which infection was conveyed, rather than to conduct the enquiry with the object of discovering the human host responsible, is a characteristic of many reports. To limit an enquiry to the problem of the rôle played by water, milk, lemonade, dust, flies, and latrines, is to fail to realise that the usefulness of an opinion, however accurate, in regard to this problem, is unimportant in comparison with the value of the discovery of the human host who is harbouring the bacillus and infecting those media. That the search for and discovery of persons who are likely to be carriers of infection is not beyond the powers of the usual medical staff in most of

the larger stations is apparent from the successful results attending the adoption of this method of enquiry in Wellington, Sialkot, Mhow, Jubbulpore, Erinpura, and some other stations. At Wellington the search was carried out with great thoroughness by the bacteriological examination of the excreta of all convalescents three times a week, and by this means one man was found to have chronic typhoid bacilluria 13 months after his attack of enteric fever. At Sialkot the search revealed the great danger which may arise from the employment of native cooks in the kitchens of British regiments. A servant in the officers' mess who had previously been assistant cook was found to have typhoid bacilluria, and two cooks of one of the squadrons of the cavalry regiment were found to be suffering from the same condition. Afterwards all natives applying for the post of cook were examined and by this means another carrier was detected. In the reports from Mhow, Jubbulpore and Erinpura the method of search was limited to an examination of the blood of suspected persons by the Widal test, and although a person whose blood gives a positive reaction with this test is not necessarily a carrier, the method affords a good starting point for more detailed investigation. At Mhow, blood specimens from three natives employed in the regimental institutes (two in the coffee-shop and one in the bakery) were found to give a positive reaction to this test, and at Erinpura the blood of one of the servants in the officers' mess where three officers had apparently contracted enteric fever was found to give a similar reaction. At Jubbulpore one European and three native servants were dismissed on the grounds of a positive reaction with the test. In the reports from Jhansi, Dinapore, Dalhousie and Fyzabad attention is also directed to the danger of native cooks. In the first of these stations suspicion rested on two cooks employed in the Royal Artillery coffee-shop. One of these men had been employed as a sweeper before being engaged as assistant cook and the other lived with his mother who worked as a sweeper. It is said that the outbreak of enteric fever in Jhansi ceased about three weeks after the dismissal of these men. In view of these instances, the opinion expressed in one of the Divisional Sanitary Officer's reports to the effect that "in the present state of knowledge as to the cause of the rise and fall of enteric incidence, all we can do towards prevention lies in general sanitary measures and inoculation" cannot be regarded as correct. The examples just referred to deal chiefly with the danger arising from "chronic carriers" but the reports contain, as usual, much evidence of the danger of infection from patients during the acute stage of the disease, and this is a matter to which frequent reference has been made in previous issues of this report. The danger is fully recognised at all stations, but despite the careful precautions adopted three orderlies nursing patients suffering from enteric fever at Rawalpindi contracted the disease, and four orderlies at other stations; in addition, two men became infected while they were patients in hospital, one at Sialkot by visiting a friend who was dying from enteric fever, the other at Nasirabad. But the chief danger from this source arises because many soldiers neglect to report that they are ill until they have suffered from fever for some days. Strenuous efforts to overcome this foolish prejudice against reporting sick are made at nearly all stations, but every year the reports contain evidence that many men fail to profit by the advice. At Rawalpindi and at Ahmednagar it was found that men had been ill for as long as seven to ten days before reporting the fact. In concluding this portion of the remarks upon the reports it is worthy of mention that other stations at which it was thought that an undiscovered carrier

of infection among the troops either in the acute stage of the disease, the convalescent stage, or the stage termed chronic carrier, was to blame were Campbellpore, Ranikhet, and Jullundur, but that at Nowshera, Multan, Kamptee and Thayetmyo it was definitely stated that carriers were not responsible.

It has been stated already that much attention is given in the reports to the different vehicles by which infection may be conveyed. As a general rule the evidence implicating any particular vehicle is very slight. No outbreak was conclusively traced to water during the year but it was suggested as the probable cause of infection of patients at Sitapur, Agra, Chakrata, Allahabad, Purandhar, Sialkot and some other stations. At Sitapur twelve of the 20 cases occurred during a fortnight. At Agra it was said that the *B. coli* was found in the municipal drinking water and that the presence of the *B. typhosus* was suspected. Milk was suggested as being possibly the cause of cases at Rawalpindi, Multan and Shwebo, ice-creams at Karachi, lemonade at Allahabad and soda water at Sialkot. Food taken in eating houses outside cantonment limits was thought to be the infecting agent at Calcutta, Madras and Quetta, and as usual a number of cases were attributed to articles of food or drink obtained in native bazaars. Infection through the medium of latrines was considered the most likely cause at Ahmednagar and Subathu and infected clothing was suspected with good reason at Kirkee. Among Europeans and Natives about 40 cases were contracted on the Bazar Valley expedition, the limited area of the camps, their proximity to insanitary villages, fouled ground, bad water, the prevalence of flies and of dust, and the incessant toil inseparable from active service being regarded as the important factors concerned. There is, as usual, a long list of stations at which either flies or dust, or both, were considered to be all-important, but as regards flies the evidence is chiefly of the nature that they were present in large numbers about the time that most cases of enteric fever occurred; the evidence implicating dust is very similar. The presence of flies in such numbers as to constitute a "plague" was reported at Poona, Kirkee and Secunderabad.

The statement in the margin shows at a glance the number of admissions to hospital, the number of deaths, and the admission and death rates per thousand of average strength, recorded from enteric fever among European troops in India during each of the last five years. Although as compared with 1907 there was a slight increase in the admission rate, the death rate was lower than in any year since 1885. The average length of stay of patients in hospital during 1908 was only 68 days as compared with 80 in 1907, and as a result the average number constantly sick was less by about 16 and the total loss of service due to the disease was less by 5,542 days than in that year. Taking into account the cases that remained under treatment at the end of 1907 the case-mortality during 1908 was only 17 per cent. which compares favourably with the figures for males of approximately the same ages under treatment in hospitals in England.

Years.	Admissions.	Deaths.
1904	1,395	267
	19·6	*3·76*
1905	1,146	213
	16·1	*2·99*
1906	1,095	224
	15·6	*3·19*
1907	910	192
	13·1	*2·77*
1908	1,001	190
	14·5	*2·76*

Enteric fever in the two Armies and in the Divisions and Geographical groups.

The disease was more prevalent and caused a higher mortality among troops in the Northern than among those in the Southern army and as regards Divisions its incidence was greatest among troops in the 1st (Peshawar) and 2nd (Rawalpindi) Divisions, and least among troops in the 10th (Burma) Division. Although the number of cases recorded as having occurred among troops of the Bazar Valley and Mohmand Field Forces is small the influence of these expeditions is perhaps seen in the high incidence of the disease among troops of the Peshawar Division. The admission rates in all except four of the geographical groups were higher than in 1907; in the North-West-Frontier and Indus Valley group (VII) which contains the stations Peshawar and Nowshera, the admission rate rose from 7·4 to 20·0 per thousand.

Enteric fever in stations.

The increased prevalence of the disease during 1908 is indicated by the fact that admission rates of over 30 per thousand were recorded in eleven stations as compared with six in 1907. The following is a list of stations (irrespective of strength) at which the highest rates were recorded, and in Table V will be found the admission and death rates in stations where the strength is over one thousand.

In group V.		In group VI.		In group VII.		In group IX.	In group XIIa.		In group XIIb.	
Benares ...	53·4	Campbellpore	36·6	Peshawar	31·3	Jubbulpore 34·6	Subathu	48·9	Purandhar	57·1
Sitapur ...	31·0	Rawalpindi	31·9	Multan	30·8		Cherat	30·2	Murree	41·4

The stations where the largest numbers of cases occurred were Rawalpindi (93), Secunderabad (80), Meerut (54), Peshawar (52), Bangalore (43), and Quetta (42). The points of interest in connection with the prevalence of the disease at these and other stations have been dealt with in a previous paragraph.

Plague and some other diseases.

Among European troops in India there were only two cases of plague during 1908 as compared with eight in the previous year and seventeen in 1906. Mhow and Kirkee were the stations at which a case occurred during 1908, the case at the latter station being fatal. Measles caused 45 admissions to hospital and erysipelas fifteen. Of beri-beri 35 cases were recorded, 28 being at Aden and six at Rangoon. The medical officer at Aden reported that the incidence of the disease was not greater among beer drinkers than among others and that it did not depend upon residence in particular buildings. The medical officer at Rangoon stated that the disease is endemic in the town. Dengue caused 165 admissions as compared with 79 in the previous year. More than two-thirds of the cases occurred at Thayetmyo where it was said that the disease became epidemic during the rains. The remaining cases were recorded at Rangoon, Madras, St. Thomas' Mount, and Dum Dum. At Madras it was considered that a number of the cases returned as "pyrexia of uncertain origin" (of which there were 74) were probably cases of typical dengue. Rheumatic affections, as usual, were responsible for a large number of admissions to hospital (namely, 511) and 27 soldiers were invalided for these diseases.

Tubercle of the lungs.

The total number of cases of tubercle of the lungs treated during the year was 93 and the total deaths were sixteen. The rate of admission to hospital fell from 1·6 per thousand in 1907 to 1·3 and the number of men invalided fell from 107 to 73. The stations at which the largest numbers of admissions occurred were Cawnpore, Colaba, Rawalpindi and Aden but the number was not more than six in any station. The death rates from tubercle of the lungs among European troops, Native troops, and native prisoners during the year were in the proportions of 10, 18, and 181, but the practice of invaliding and of granting "sick leave" in the army prevents the figures being comparable.

Pneumonia.

In accordance with the practice adopted in the new edition of the Nomenclature of Diseases, pneumonia has been removed from the list of respiratory diseases and is recorded as an infective disease. The admission and death rates from it in 1908 were 3·9 and ·39 per thousand, respectively, as compared with 2·8 and ·35 in 1907, the total numbers of admissions and deaths in each year being 269 and 27 in 1908 and 195 and 24 in 1907. The disease was considerably more prevalent in the Northern than in the Southern army and as regards its incidence in comparison with its incidence in 1907 it was more prevalent in nine of the geographical areas and less so in only two. Excluding stations where the average strength was below 200, Hyderabad, Dum Dum, Nowgong, Allahabad, and Dagshai were the stations with the highest admission rates during 1908.

Respiratory diseases.

There was a decrease in the admission rate on account of respiratory diseases from 21·9 per thousand in 1907 to 17·4 and there were six deaths from these diseases as compared with eight in that year. The Upper Sub-Himalaya area was that in which the diseases were most frequent, and as regards stations with a strength of over 200, Bellary, Bareilly, Ahmednagar, and Kirkee were those in which the highest admission rates were recorded. Of the six deaths under the heading two were due to broncho-pneumonia, one to bronchitis, two to empyema, and one to cirrhosis of the lung.

Dysentery and diarrhœa.

Dysentery was more prevalent among all classes of people in India than during 1907, and the admission and death rates among European troops rose from 11·7 and ·33 per thousand, respectively, to 14·4 and ·42. The disease was more prevalent and fatal in the Southern than in the Northern army, and as regards Divisions it was most prevalent among troops in the 5th (Mhow), the 9th (Secunderabad) and the 6th (Poona) Divisions. As regards geographical groups the disease was most prevalent in the Southern India group (XI) and most fatal in the Burma Inland group (II). Excluding stations with a strength below 150, the highest admission rates were recorded at Saugor, Madras, and Jubbulpore. For the European army as a whole the months of greatest prevalence were August and September, and those of least prevalence February and January.

There were 1,217 admissions with one death on account of diarrhœa as compared with 992 admissions and 29 deaths on account of dysentery. The admission rates were highest among troops in groups VII and VI, and among stations

where the strength was 200 or above, Lebong, Neemuch, and Nowshera were those at which the disease was most prevalent.

Hepatic abscess.

Abscess of the liver was considerably less prevalent during 1908, the number of admissions to hospital being 115 and the deaths 55, as compared with 165 and 70, respectively, in the previous year. The disease caused more admissions and deaths among the troops of the Northern than of the Southern army, and as regards Divisions the admission rate was highest among troops in the 2nd (Rawalpindi) Division and the death rate among troops in the 1st (Peshawar) Division. One or more cases occurred in 46 stations, the largest numbers of cases being in Lucknow, Poona, and Rawalpindi.

Alcoholism.

There were only 71 admissions to hospital and only three deaths from alcoholism as compared with 94 admissions and seven deaths during 1907. A very satisfactory decline in the admissions to hospital under this heading has occurred in recent years.

Venereal diseases.

The recorded admission rate for all venereal diseases in 1908 was 69·6 per thousand, the death rate was ·04 per thousand and the constantly sick rate was 8·8 per thousand. These figures are represented in actual numbers by 4,801 the total admissions, 3 the deaths, and 606·13 the number constantly sick throughout the year. The admissions were less by 1,435 than in 1907 and the total number constantly sick was less by 129·14. The causes of the rapid and steady fall in the rates relating to these diseases which has formed so remarkable a feature of the health statistics of European troops in India during recent years have been referred to at length in previous issues of this report. The table in the margin shows that the indication of the decline in syphilis afforded by the figures of the "syphilis register" continues to be satisfactory. The register contains the names of all men who came under treatment for syphilis for the first time, which means that it contains the names of those who contract the disease during the year to which the register relates.

Years.	Number of names on the syphilis register.
1904	2,947
1905	1,470
1906	936
1907	797
1908	545

The average period of detention in hospital of a patient suffering from any form of venereal disease during 1908 was 46·21 days, and the total loss of service involved amounted to 221,844 days, the non-efficiency thus reckoned being more than three times as much as that incurred on account of enteric fever.

There were only three deaths attributed to venereal diseases during 1908 and the number of men invalided for this cause was only 74. The figures compare favourably with those of former years.

Venereal diseases are always less prevalent among troops serving in the north of India than among those serving in the south, and in 1908 the admission rate among troops of the Northern army was only 58·3 per thousand as compared with a rate of 84·1 among troops of the Southern army. As regards Divisions the admission rates were, as usual, highest among troops in the Burma and Secunderabad Divisions. Excluding stations at which the average strength

was below 100, the highest admission rates were recorded as regards the Northern army at Fort William, Delhi, and Fyzabad, and as regards the Southern army at Madras, Mandalay, and Shwebo.

The admission rate on account of gonorrhœa was 37·8 per thousand and that on account of soft chancre 16·1 as compared with rates of 48·0 and 19·7 respectively in 1907. Fifteen men as compared with 21 in the previous year were invalided for gonorrhœa during 1908.

Heat stroke.

The total number of deaths recorded as a result of heat-stroke during 1908 was 37 as compared with 26 in the previous year and 39 in 1906. The stations at which most deaths from this cause occurred were Nowshera, Lucknow, Lahore Cantonment, and Peshawar.

Suicide.

The mean annual number of suicides reported in the decade 1897 to 1906 was 20, and in 1908 the number was 26 of which nineteen were by gunshot, four by cut throat, two by drowning and one by being run over by a train.

Invaliding.

From the European army of India 1,078 men were invalided in 1908 (15·64 per thousand of strength) as compared with 1,768 (25·50 per thousand) in the previous year. In the Northern army the rate was 16·06 per thousand of strength and in the Southern army it was 16·17 per thousand.

The practice of sending men, who a few years ago would have been invalided to England, to one of the hill stations in India has been the chief factor in reducing the invaliding rate among European troops. The chief diseases for which invaliding was necessary in 1908 have already been mentioned in paragraph 2. Of the total number of men invalided 82 per cent were under 30 years of age, and 70 per cent. had been less than five years in India.

Officers.

The average strength of commissioned officers with European troops in India during 1908 was 2,188, and among them there were 1,462 cases of sickness, 92 were invalided, and 21 died during the year. The admission and death rates were higher than in 1907, but the invaliding rate fell from 55·35 per thousand to 42·05.

Enteric fever was more prevalent among the commissioned officers than among the non-commissioned officers and men, but the death rate among them was only 1·37 per thousand as compared with 2·76 among the men. The officers suffered much less than the rest of the army from malaria and this was attributed in some stations (*e.g.*, Lahore cantonment) to the careful use of mosquito curtains and other measures of individual prophylaxis. No case of plague occurred, but there were eight non-fatal cases of small-pox and one fatal case of cholera. Enteric fever and malaria were the chief causes of invaliding.

Women.

The average strength of the women during 1908 was 3,696, an increase of 200 on that of the previous year. The statistics of health were unfavourable, the rates of admission to hospital and of death being 719·7 and 13·53 per thousand, respectively, as compared with 657·6 and 6·58 in 1907. The constantly sick rate

was 30·5 per thousand as compared with 28·8. The chief causes of admission to hospital were, as usual, debility, malaria, and diseases peculiar to women which together accounted for 62·82 per cent of the total number of admissions from all causes. Of the 59 deaths seven were due to enteric fever, seven to small-pox, seven to childbirth and abortion, six to malaria, three to cholera and three to pneumonia. The admission rate from small-pox was twelve times as high as among the men and the death rate was sixty-three times as high. Except the neglect of vaccination and re-vaccination among the women there is no reason that adequately accounts for the great difference.

Children.

The admission, constantly sick and death rates among the children were all much higher than in 1907. The strength was 5,819, the admission rate 450·1 per thousand, the constantly sick rate 16·3 and the death rate 50·18. The chief causes of sickness were malaria, diarrhœa, and respiratory diseases which together accounted for 34 per cent of the total admissions. Of the 292 deaths 46 were attributed to diarrhœa, 30 to debility and immaturity at birth, 27 to respiratory diseases, 21 to convulsions and 15 to dysentery. There were 21 admissions to hospital with two deaths from enteric fever and 361 admissions with 13 deaths from malaria. Among the exanthemata to which children are liable there came under treatment during the year 190 cases of measles, 20 of chicken-pox, eight of small-pox and two of scarlet fever. There were also 36 cases of whooping cough, eleven of mumps and eleven of diphtheria.

Native Troops.

(For statistical tables *see* pages 160 to 163.)

India.

The average strength of the Native troops, including those on duty in China and other stations outside India, was 126,975 as compared with 126,392 in 1907. From the statement in the margin it will be seen that their statistics of health, while being more favourable than those of European troops, were not quite so satisfactory as in 1907 when the rates of constantly sick, of invaliding, and of mortality were the lowest on record. The death rates shown in the table do not include the statistics of men who died while on sick leave or on furlough at their homes; if these were included the death rate for 1908 would be 8·49 per thousand instead of 7·41.

Native troops.	All causes. Ratios per mille.		
	1902-06.	1907.	1908.
Admissions	649·5	628·9	674·4
Constantly sick	24·4	21·7	22·8
Deaths ...	8·93	6·27	7·41
Invalids ...	10·00	5·76	6·63

The increase in the rate of admission to hospital was due almost entirely to the greater prevalence of malaria, the admission rate from this disease being 266 per thousand as compared with 225 in 1907, but among the more important diseases the admission rates from dysentery, diarrhœa, enteric fever and cholera were also higher than in that year. On the other hand respiratory diseases, influenza, anæmia and debility, scurvy, Malta fever, and plague were considerably less prevalent, and from typhus fever there were only four admissions and two deaths in the year under review as compared with 24 and four, respectively, in 1907. The increased death rate was due chiefly to a higher mortality from cholera, enteric fever, and pneumonia, but the death rates from respiratory diseases and tubercle of the lungs were also higher than in 1907. Plague caused only 14 deaths as compared with 56 in that year, and malaria only 74 as compared with 84, but as regards the latter disease the removal of the heading "remittent fever" from the returns is doubtless the most important factor concerned in the reduction.

The chief causes of sickness were malaria, dysentery, respiratory diseases pyrexia of uncertain origin, and venereal diseases, in order of their relative prevalence, malaria accounting for over 39 per cent., and dysentery for about 6 per cent., of the total number of admissions from all causes. The principal causes of death were pneumonia, cholera, malaria, enteric fever and tubercle of the lungs, these diseases accounting, respectively, for 29·7 per cent., 12·3 per cent., 7·9 per cent., 7·8 per cent., and 5·6 per cent., of the total number of deaths from all causes.

The number of men invalided for discharge from the service was 842 as compared with 728 in 1907, mainly from tubercle of the lungs, injuries, debility, and malaria.

If table XI be compared with table II it will be seen that the Native troops suffered less than the European troops from pyrexia of uncertain origin, venereal diseases, enteric fever, diarrhœa, hepatic affections, and influenza, but that they suffered more from each of the other causes of sickness tabulated. An interesting comparison is that dealing with the relative incidence among the

two classes of troops of malaria and pyrexia of uncertain origin on the one hand and of dysentery and diarrhœa on the other. According to the statistics the Native troops suffer more than the European troops from malaria and dysentery, but less from pyrexia of uncertain origin and diarrhœa. An analysis of the statistics and case sheets indicates that the recorded contrast is due chiefly to differences of diagnosis, and that a proportion of the cases diagnosed as malaria and dysentery, respectively, in the Native army would if they occurred in the European army be diagnosed as pyrexia of uncertain origin and diarrhœa.

The statistics of Native troops located in stations outside India will be found in Tables XXVIII* and XXIX* and the following summary contains details not given in those tables. The average strength of the troops serving in North China was 863, the rate of admission to hospital was 450·8 per thousand and the death rate was only 2·32 per thousand. The good state of health of these troops is indicated by the fact that of the 389 admissions to hospital no fewer than 288 were for causes that are not considered sufficiently important to be tabulated separately in the standard tables*. The average strength of the troops in Colombo and Singapore was 1,540, the admission rate was 613·6 per thousand and the death rate only 1·95. In the stations of the Aden Brigade (Aden, Khormaksar, and Perim) the average strength was 801, the admission rate was 619·2 per thousand and the death rate 6·24; and the corresponding figures for troops in stations on the Persian Gulf were 240, 629·2, and 37·50. The average annual strength of Native troops employed with the Bazar Valley and Mohmand Field Forces, which have already been referred to in the preceding section works out to 1,518, and the rates of admission to hospital and of mortality were 442·0 and 28·99 per thousand respectively. The number of men killed in action or who died from wounds received in action was 36. Wounds and injuries were the chief causes of admission to hospital and of mortality. There were twelve cases of cholera with five deaths.

Northern and Southern Armies Divisions.

From Table X it will be found that the sickness and mortality among the Native troops of the Northern army were much greater than among those of the Southern army, the admission rate per thousand being higher by 197·9 and the death rate by 2·39. The higher admission rate in the Northern army was due almost entirely to the prevalence of malaria and the higher death rate was due chiefly to the mortality from pneumonia and cholera. The relative incidence of different diseases on the Native and European troops of the two armies corresponded, except in regard to influenza, small-pox, respiratory diseases, pyrexia of uncertain origin, dysentery and diarrhœa. As regards the Divisions, the statistics of troops in the 1st (Peshawar) Division were the least favourable during 1908, the 2nd (Rawalpindi) Division standing next in the list, and the 7th (Meerut) Division third.

Geographical groups.

For the year under review as in the previous year the geographical areas numbered VII (North-West Frontier) and X (Western Coast) must be considered to have been most unhealthy for Native troops. Malaria and pneumonia were most prevalent in the North-West Frontier geographical group, tubercle of the lungs

* When a Table or Appendix is marked with an asterisk it refers to the Standard Tables or Appendices of the Sanitary Commissioner's Annual Report.

in the Gangetic plain group and dysentery in the Burma Coast group. The highest death rates were recorded in groups XII (Hill Stations) where the mortality was due chiefly to pneumonia, and X (Western Coast) where it was due chiefly to malaria and pneumonia.

Stations.

In 1908 there were 41 stations in which the average strength of Native troops was over one thousand. The rates of admission to hospital were very high in five, namely, Dera Ismail Khan, Edwardesabad, Peshawar, Dehra Dun, and Kohat, and the death rates were high in Abbottabad, Dera Ismail Khan, Peshawar, Lahore Cantonment, and Sialkot. In Dera Ismail Khan the admission rate was 1,881·2 per thousand and the death rate 11·82, the chief cause of the large amount of sickness being malaria, which accounted for 59 per cent. of the total admissions to hospital. In Edwardesabad the admission rate was 1,209·5 per thousand, in Peshawar it was 1,127·8, in Dehra Dun it was 1,080·6 and in Kohat 1,058·8, malaria being in all these stations the chief cause of the high rate. The highest death rate in any of the larger stations during the year was 18·56 per thousand recorded at Abbottabad, the chief causes of the mortality being cholera, pneumonia, and enteric fever. Abstracts of the cantonment sanitary reports upon 24 of the most unhealthy stations will be found in Table XXX*, so it is unnecessary to refer to them in detail here. Among regiments with a record of much sickness and mortality during the year were the 1-6th Gurkhas at Abbottabad, the 86th Carnatic Infantry at Secunderabad, the 112th Infantry at Nasirabad, the 1-2nd Gurkhas at Drosh, and the 41st Dogras at Cawnpore. The admission rates in these regiments ranged between 420 and 1,040 per thousand, and the death rates between 21·46 and 33·16 per thousand.

Influenza.

Influenza was less prevalent among Native than among European troops, and the rate of admission to hospital fell from 6·5 per thousand in 1907 to 3·8. Most cases occurred at Hong Kong, Secunderabad, Kirkee, Bakloh, and Nowshera. Among the Native troops as a whole January, February, and March were the months during which the disease was chiefly prevalent, and June was the month in which it was least prevalent.

Cholera.

In the Native army, as in the European, cholera was much more prevalent than in the previous year, 174 cases with 116 deaths being reported compared with only 34 and 24 in that year. The disease was widespread among the general population of the country and as regards the Native troops the increased incidence is shown by the fact that a case or cases occurred in fifty regiments located in 29 stations as compared with thirteen regiments located in eleven stations in 1907. At Abbottabad there were 36 cases with 29 deaths, at Secunderabad 32 cases with 13 deaths, at Cawnpore 14 cases with eight deaths and at Nowshera eleven cases with ten deaths. Twelve cases with five deaths occurred among the Native troops of the Mohmand Field Force. The regiments with most cases were the 1-6th Gurkhas at Abbottabad in which there were nineteen, the 86th Carnatic Infantry at Secunderabad in which there were eighteen and the 41st Dogras at Cawnpore in which there were fourteen. The outbreak at Abbottabad was investigated by the Sanitary Officer of the Rawalpindi Division. Apparently some of the

patients became infected in a brothel situated just outside cantonment limits, but the most interesting feature of the outbreak was the large proportion of attacks among persons who came in contact with cholera patients in hospital. There were eleven cases among such persons, namely, hospital cook one, sweepers two, soldier patients five, soldier nursing attendants two, women segregated in the hospital compound one. The Sanitary Officer found that in the hospitals of the Gurkha regiments the arrangements in connexion with the water supply and with the removal and disposal of patients' excreta were very unsatisfactory.

Small-pox.

There were 103 admissions to hospital on account of small-pox during 1908 as compared with 48 during 1907, but the number of deaths from the disease was only three as compared with five. The rate of mortality per thousand of strength was lower than the rate for European troops. For a number of years it has been the rule that the statistics of this disease among Native troops compare favourably with the statistics among European troops. Prior to 1886 the reverse was invariably the case, and the change indicates that of late years vaccination and re-vaccination have been more thoroughly attended to in the Native than in the European army. Small-pox is usually a very fatal disease among natives of India, but that vaccination and re-vaccination have conferred upon the Native troops a remarkable protection from death from this disease is shown by the fact that only 30 out of the 695 cases that have occurred among them during the last ten years were fatal. These figures give a case-mortality of only 4·3 per cent. which is only about one-fourteenth that of cholera and about one-fifth that of pneumonia.

During 1908 a case or cases of small-pox occurred in 40 regiments, but there was only one case in 19 regiments and there were only two in ten. The largest numbers in any regiment were sixteen in the 73rd Carnatic Infantry and fifteen in the 79th Carnatic Infantry, both at Aurangabad. But there was no death from the disease in either of these regiments and it is said that on account of previous vaccination the cases were of a remarkably mild type. On the other hand ten cases that occurred among unvaccinated women and children of one of these regiments were very severe and four of the ten were fatal.

Malaria.

Malaria accounted for over 39 per cent. of the total number of admissions from all causes and the admission rate per thousand was 266 as compared with 225 in 1907. The increase was chiefly among troops of the Northern army, but the admission rates recorded in all except two of the twelve geographical groups were higher than in 1907, the two exceptions being Burma Coast (I) and Bengal and Orissa (IV). For the whole Native army the months of greatest prevalence were, as usual, October and November. In stations where the average strength was over 150 those at which the highest admission rates were recorded were Chakdara (1,546 per thousand), Dargai (1,159), Dera Ismail Khan (1,112), Jandola (1,033), Simla (868), Baroda (702), Peshawar (647), Dehra Dun (620), Dibrugarh (612) and Delhi (601). In five other stations the admission rate was over 500 per thousand of strength and in seven more it was over 400. The high admission rate among the troops at Dargai appears to have been due to residence not at Dargai, but at Chakdara, where despite careful arrangements for administering quinine prophylactically and efforts to destroy larvæ and adult mosquitoes, malaria was exceedingly prevalent in the 82nd Punjabis. On account

of the severity of the outbreak all the recruits of the regiment were sent to Dargai early in October. Dera Ismail Khan was garrisoned by the 29th Mountain Battery, the 16th Cavalry, the 20th Infantry, the 69th Punjabis, the 47th Sikh Infantry, and a wing of the 27th Punjabis, the average annual strength of the Native troops being 2,475. The 29th Mountain Battery, the 16th Cavalry, and the 47th Sikhs suffered most. It is said that the river overflowed its banks and that large areas of water existed within a short distance of the cantonment. Anti-mosquito operations and the administration of quinine prophylactically were carried out. The high admission rate at Simla was due to the arrival there in October of the 34th Pioneers from Lahore Cantonment where the regiment became very heavily infected with malaria. For the three months from October to December the annual admission rate from the disease in this regiment was 2,227 per thousand and the death rate 25·21 per thousand. In another regiment, the 32nd Pioneers, which arrived about the same time from Ambala, the annual admission rate from malaria for the three months was only 230 per thousand.

The following table is of interest in connexion with the remarks upon malaria that were made in the section relating to the European army :—

Malaria in the Native army. Quinquennial admission rates per 1,000 of strength.

1879—1883	1884—1888	1889—1893	1894—1898	1899—1903	1904—1908
662·	451·	467·	341·	305·	228·

Unfortunately the practice of treating Native soldiers suffering from malaria as out-patients prevails to so great an extent and varies so greatly in different years and in the practice of different medical officers that very little, if any, importance can be attached to these figures. The statistics of Native soldiers treated as out-patients are not shown in any published return and there is evidence that in recent years the introduction of special anti-malarial measures has sometimes been followed by the use of the out-patient system of treatment to an extent that makes the recorded rates of admission to hospital quite valueless as an indication of the amount of malaria among the Native troops.

Pyrexia of uncertain origin.

Under the heading "Pyrexia of uncertain origin," which appears for the first time in the returns for 1908, there were recorded 2,056 admissions to hospital and eleven deaths. To a great extent the heading has been used as a substitute for the heading "simple continued fever," which no longer appears in the returns, but a number of severe illnesses, having fever as a prominent symptom in which the diagnosis was obscure, were also included under it. The Sanitary Officer of the Rawalpindi Division investigated the cause of fevers of undetermined origin among the Gurkha troops and followers at Abbottabad. He considered that some of the cases that occurred from March to May among musicians and followers of the 1-5th Gurkhas were probably typhus fever and that most of the undeter-

mined fevers of long duration were typhoid or paratyphoid fever. The fevers of short duration were difficult to diagnose but he thought that some of them were influenza and others mild cases of malaria. He was of opinion that the more general employment of all the diagnostic methods at present available would show that no hitherto unknown disease is included among the "fevers" at Abbottabad. This remark, however, is not applicable generally for an examination of the case sheets of the eleven fatal cases recorded under the heading during 1908 shows that in some instances the diagnosis remained obscure although no known diagnostic method was left untried.

Kala-azar.

There were nine cases diagnosed as kala-azar during the year as compared with twelve in 1907. They occurred in the following regiments and stations: six in the 2-2nd Gurkha Rifles at Dehra Dun, one in the 1-2nd Gurkhas at Kila Drosh, one in the 2-5th Gurkhas at Abbottabad and one in the 2-9th Gurkhas at Dehra Dun. Four of the cases were fatal during the year. The diagnosis was confirmed by finding the Leishman-Donovan parasites in blood obtained by splenic or hepatic puncture or in smears from the spleen after death. The medical officer of one of the regiments at Dehra Dun considered that the prevalence of the disease in that station is increasing.

Typhus fever. Relapsing fever.

In 1908 only four admissions and two deaths from typhus fever were recorded among Native troops as compared with 24 admissions and four deaths in 1907. The cases occurred in the 17th Cavalry at Bannu, the 57th Rifles and the 59th Scinde Rifles at Peshawar and the 5th Mountain Battery at Quetta. It has already been mentioned that the disease may also have been present at Abbottabad. Relapsing fever which had caused 26 admissions and three deaths in 1907 caused only two admissions and one death in 1908. The cases occurred in the 110th Mahratta Light Infantry at Ahmednagar and the 1st Lancers at Lucknow.

Enteric fever.

The table in the margin shows the noteworthy increase that has occurred in the number of cases diagnosed as enteric fever in the Native army during recent years. It is coincident with a yearly decline in the number of cases recorded under the heading remittent fever, and the unusually large increase in 1908 is perhaps due to the removal of that heading from the list of diseases in the annual returns. Since the beginning of 1908, the possible headings for the return of a case in which fever of long duration is the only prominent symptom, have been malaria, enteric fever, Malta fever, and pyrexia of uncertain origin, and, having regard to the much greater care that is now adopted before returning a case as malaria, as well as to the more general employment of the serum tests in diagnosis, and to the omission of the previously much used heading remittent fever a marked increase in the admissions recorded under the heading enteric fever, was to be expected. The probability that altered diagnosis rather than a real extension of prevalence

Enteric fever., Native troops.

Years.	Total admissions.	Admission rate per 1,000
1902	50	·4
1903	80	·6
1904	70	·6
1905	130	1·1
1906	127	1·0
1907	182	1·4
1908	350	2·8

is the cause of the recorded increase is supported by the results of a more detailed examination of the statistics. Such an examination shows that the comparatively large number of cases is due, not to the appearance of the disease in epidemic form in particular regiments, but to the occurrence of from one to three cases in a much larger number of regiments than in former years. Thus the 350 attacks recorded in 1908 comprised cases from no fewer than 113 regiments of which there were 52 in which only one case occurred, eighteen in which two cases occurred, thirteen in which three cases occurred and nine in which four cases occurred, so we are left with only 21 regiments in which more than this number occurred during the year. It is found also that, in the regiments in which a considerable number of cases were reported, as in the 1-9th and 2-9th Gurkha Rifles in which there were 24 and 18 respectively, the incidence of the cases was such as to negative the view that the disease was present in epidemic form. An investigation of the disease in Dehra Dun, where those regiments were stationed, was made by the Sanitary Officer of the Meerut Division who reported that nearly 49 per cent. of the patients had contracted the disease by casual infection from different sources and at different times outside the cantonment, and that, of the remainder, probably a considerable number had become infected in Rajpur. The source of infection was not definitely ascertained in any case that occurred among Native troops during the year and this is not surprising when we know that the great majority were diagnosed on their admission to hospital as malaria and that usually 10 days or a fortnight elapsed before the diagnosis of enteric fever was made by the ineffectiveness of quinine in treatment and by the results of a serum test. It will probably be some years before what may be called the normal incidence of enteric fever among Native troops is accurately reported and until then it would be wrong to consider that the real prevalence of the disease is increasing among them.

Malta fever.

From the statement in the margin it will be seen that after a considerable increase in the number of cases of Malta fever among Native troops there has been a fall to 23 cases in 1908. Of these eleven occurred in Ambala, two in Lahore Cantonment, two in Sehore and one in each of the following stations: Sialkot, Rawalpindi, Dera Ismail Khan, Multan, Jhansi, Drosh, Chitral and Fort Lockhart. The largest number of cases in any regiment was seven in the 32nd Sikh Pioneers at Ambala. All the patients in this regiment gave a history of having drunk goat's milk, but although many goats in an adjacent village were examined none was found to be infected. An order was issued prohibiting the bringing of female goats to the lines, and it is said that after the issue of this order only one doubtful case of Malta fever occurred.

Malta fever. Native troops.		
Years.	Total admissions.	Total deaths.
1902	4	...
1903	8	...
1904	5	1
1905	43	1
1906	38	1
1907	62	2
1908	23	...

Plague.

Coincident with a great decrease of plague among the general population of India in 1908 the number of cases among Native troops fell from 85 in 1907 to 36, and the number of deaths from 56 to 14. Of the cases, fifteen with five deaths occurred at Poona and ten with six deaths at Bangalore. The 26th Light Cavalry, the 80th Carnatic Infantry and the 20th Deccan Horse were the regiments affected.

at those stations. The remaining cases occurred in 10 different regiments located in 8 stations.

Scurvy.

The total number of admissions to hospital on account of scurvy during 1908 was 191 which gives a ratio of 1·5 per thousand as compared with a ratio of 2·3 per thousand in the previous year. About 58 per cent. of the admissions in 1908 were recorded among troops in the Southern Army and about 39 per cent. among troops in the Northern Army; and as regards geographical groups over 25 per cent. of the admissions occurred among troops in group XII (Hill stations) and about 21 per cent. among troops in group VIII (North-West Frontier). The largest numbers of cases were recorded in the 126th Baluch Infantry (18 admissions) and the 112th Infantry (14 admissions). The head-quarters of the 126th Baluch Infantry was at Quetta, but 17 of the cases of scurvy occurred among men of the detachment at Robat where the only vegetables available were onions, and even these were not obtained during June. Thirteen of the cases occurred during July. The 112th Infantry were stationed at Nasirabad, but they provided detachments for stations on the Persian Gulf where the cases of scurvy occurred.

Tubercle of the lungs.

The admission rate on account of tubercle of the lungs rose from 2·5 per thousand in 1907 to 3·0 and the death rate from ·33 to ·42, the total number of admissions and deaths being 322 and 42 in 1907, and 378 and 53 in 1908. Among Gurkhas there were 77 cases and 22 deaths as compared with 62 cases and 14 deaths in the previous year, the admission and death rates among this class of the Native troops being 5·0 and 1·43 per thousand, respectively, as compared with 2·7 and ·28 among the rest of the Native army. But the statement in the margin shows the noteworthy decline in the prevalence of and mortality from the disease that has occurred among Gurkha troops during the last four years. Next to Gurkhas, the Dogras in the Native army suffer most from tubercle of the lungs and in 1908 the largest number of admissions in any regiment occurred in the 41st Dogras who were stationed during 1907 and part of 1908 at Shan-hai-kwan, Tongshan and Tientsin in North China. Among regiments stationed in India the largest numbers of admissions were recorded in the 1-7th Gurkha Rifles at Quetta (14), the Queen's Own Corps of Guides at Mardan (10), and the 2-1st Gurkha Rifles at Dharmsala (8). Frequent inspections for the discovery and invaliding of early cases of tubercle as well as improved arrangements for the ventilation of barracks have doubtless been important factors in reducing the prevalence of the disease in Gurkha regiments.

TUBERCLE OF THE LUNGS AMONG GURKHAS. RATIOS PER THOUSAND.

Years.	Admissions.	Deaths.
1899	15·4	5·09
1900	14·4	4·34
1901	13·1	3·95
1902	15·6	4·24
1903	28·9	2·88
1904	10·6	2·66
1905	6·1	1·58
1906	5·2	2·41
1907	4·8	1·03
1908	5·0	1·43

Pneumonia.

The admission rate on account of pneumonia was 12·8 per thousand and the death rate 2·20 as compared with rates of 12·4 and 1·99 per thousand, respectively, in 1907. The disease was more prevalent than in the previous year in nine of the twelve geographical groups the highest admission rates for

the year being recorded in the North-West Frontier group (21·3 per thousand) and the Hill Stations group (15·5). The months of greatest prevalence were, as usual, January, February, March, November and December. Among stations where the average strength was over 100 the highest admission rates were recorded in Kherwara (93·5 per thousand), Jacobabad (45·9), Fort Sandeman (44·5) and Amritsar (41·3), and as regards regiments the highest rates were recorded in the 20th Infantry at Dera Ismail Khan, the Queen's Own Corps of Guides at Mardan, and the 52nd Sikhs at the Malakand. In the Frontier stations, where the winter is severe, the custom of visiting the latrines in the early morning without wearing sufficient clothing to protect against a chill is stated to be a common cause of pneumonia.

Dysentery and diarrhœa.

Dysentery was more prevalent than in 1907, but the number of deaths was nearly the same. The disease was most prevalent at Jandola, Barrackpore, Santa Cruz, Singapore and Allahabad. The medical officer of the 2nd Rajput Light Infantry in which most cases occurred thought that the disease was due to inferior food stuffs purchased in bazaars. It was next most prevalent in the 99th Deccan Infantry at Singapore where the medical officer reported that the climate and the condition of the barracks and their surroundings were very unfavourable to the health of the troops. He stated that the barracks were condemned eight years ago, and that they are surrounded by swamps, insanitary houses and highly manured fields.

There were in all 1,115 admissions to hospital and eight deaths from diarrhœa as compared with 859 and two in 1907. The regiments in which most cases occurred were the 2-7th Gurkha Rifles, the 113th Infantry, and the 129th Baluchis. Chills and indiscretions in diet were regarded as the important causes.

Venereal diseases.

The statement in the margin shows that while the admission rates from venereal diseases among both Native and European troops have decreased during recent years the decrease among Native troops has not been nearly so marked as among European troops. It shows also the great difference that exists between the recorded prevalence of the diseases among the two classes of troops. During 1908, among European troops with an annual average strength of 68,933 there were 4,801 admissions from venereal diseases while among Native troops with an annual average strength of 126,975, there were only 1,934 admissions. The slight increase in the admission rate among Native troops in 1908, as compared with the rate in 1907, was confined to troops of the Southern Army, and among those troops the diseases were, as usual, more prevalent than among troops of the Northern Army, the admission rates being, respectively, 20·1 and 12·8 per thousand. The prevalence of venereal diseases among Gurkha troops continues to diminish and in 1908

Years.	Venereal diseases, admission rates per 1,000.	
	Native Troops.	European Troops.
1903 ...	24·5	247·0
1904 ...	20·6	198·5
1905 ...	19·6	153·7
1906 ...	16·2	117·3
1907 ...	14·7	89·9
1908 ...	15·2	69·6

the admission rate among them was only 18 per thousand as compared with 15 per thousand among the remainder of the troops. Excluding stations at which the average strength was less than 100, the highest admission rates among Native troops in the Northern Army were recorded at Almora, Kohima, Simla, Dehra Dun, Fort William and Mardan, and among troops of the Southern Army at Cannanore, Bombay, Belgaum, Poona and Jacobabad. Among all the Native troops in India the admission rate for syphilis was 4·9 per thousand, for soft chancre it was 4·3 and for gonorrhœa it was 6·0 as compared, respectively, with the figures 4·9, 4·3 and 5·8 in 1907.

Beri beri.

There were thirteen admissions to hospital and there was no death from beri beri during 1908, the figures, as usual, comparing favourably with those for European troops. Ten of the cases occurred in the 83rd Light Infantry stationed at Cannanore and one case in each of the following regiments—the 79th Carnatic Infantry at Aurangabad, the 93rd Burma Infantry at Mandalay and the 98th Infantry at Colombo. In the 83rd Infantry the disease was of a mild type and was confined to recruits. No case was reported among the civil population of the district and, beyond suggesting that the consumption of bad rice may have been concerned, the medical officer was unable to account for the outbreak.

Suicide.

During the ten years 1898 to 1907, there were altogether 119 cases of suicide in the Native army, a mean of about twelve per annum. There were only seven in 1908, of which five were by gunshot and two by hanging.

Jails of India.

(For Statistical tables *see* pages 164 to 166.)

India.

The condition of the people of India is dominated by the rainfall; and any considerable departure from the normal either in amount or distribution generally sets in motion a train of consequences ending in poverty, sickness and death. The health of the prisoners must always be influenced to some extent by the condition of the people, owing to the continuous flow into the jails of large numbers of the poorest and lowest classes. In ordinary years the effect of this influx is not perceptible, the numbers are not in excess of the accommodation provided, the proportion of sick persons among the newly admitted prisoners is small and the figures relating to them are lost in the general statistics, while the precautions against the introduction of infectious diseases into the jails rarely fail. In extraordinarily unfavourable years, however, the position is profoundly changed, the number of prisoners is so greatly increased that many of the jails are overcrowded, the proportion of sick among the newly admitted is so large that the general statistics are modified, and so severe is the constant strain on the precautions against the importation of infection, that they occasionally break down.

In 1908 all the conditions influencing the health of the prisoners were extraordinarily unfavourable. The south-west monsoon of 1907 receded prematurely, and in consequence the spring crops of 1908 were bad everywhere, excepting in Eastern Bengal and Assam and in Lower Burma, and, although the autumn crops were generally good, except in Bengal, the epidemic of malarial fever which ravaged Upper India delayed the harvest. Poor and belated harvests raised the already high prices; high prices led to an increase of crime, and the number of prisoners admitted into the prisons rose from 291,165 in the preceding year to 341,831, a total increase equal to 17 per cent. The increase was not, however, equally distributed; it was 50 per cent. in the Central Provinces, 28 per cent. in Bengal and the Punjab and 26 per cent. in the United Provinces, all administrations in which tubercle, or diseases of the lungs, or both, levied a higher toll of deaths than usual. Not only were many of the prisons continuously overcrowded, but, as we shall see, a large proportion of the newly admitted prisoners were in a bad state of health owing to the effects of scarcity and malarial infection.

The rainfall of 1908 was abnormal: in the cold weather it was in excess, but irregularly distributed, in the hot weather it was in defect, except in Upper India, Berar and Mysore, and during the monsoon period although in defect in the eastern parts of Upper India, it was in enormous excess over north-western India. In every province, except Eastern Bengal and Assam and Bombay, the general mortality was greater than usual, the increase in the death rates being specially noticeable in Upper India, where the mortality of the previous quinquennium, with which comparison is made, was greatly enhanced by plague, which was happily not a serious factor in the death rates of 1908.

It is highly creditable to those concerned with the administration and management of the prisons that, in spite of all those adverse conditions, the health of the prisoners remained fairly good; the admission and constantly sick

rates were only slightly higher than the low rates to which we have been accustomed in recent years, and, although the death rate (24·17 per 1,000) represents more than a check in the steady fall that has been taking place, it would have been considered a low rate ten years ago.

Comparisons are frequently made between death rates of prisoners and of the general population, and such comparisons may be useful and instructive if sufficient allowance is made for the very different circumstances of the two communities. Prisoners labour under certain disadvantages, but these are much more than balanced by advantages. Prisoners are below the average of the general population in general vitality, they are exposed to the depressing influences of jail life and to a certain monotony of routine and diet, and they live together in large numbers, so that if an infectious disease does become established among them the consequences may be serious. On the other hand, save that the proportion of females, who everywhere (except in the Punjab) die at a lower rate than males, is small, the constitution of the prison population is favourable to a low death rate; there are no children, the majority of prisoners are in the prime of life and the number of very aged among them is usually small. Prisoners are well housed and clad and abundantly fed, they are watchfully cared for in health and skilfully tended in sickness. It is obvious, then, that the death rate among them ought to be lower than that of the general population. It is, perhaps, not so obvious that measures that are successful in preventing or curing a particular disease among prisoners, may not be equally successful among the general population. Among prisoners such measures can be efficiently carried out in every detail, and they are aided by all the conditions of good hygiene; among the general population some conditions, including perhaps one that is essential to success, may be absent, while other factors that favour the disease may be present.

Comparison of death rates among prisoners and among the general population.

The mean daily prison population, including the convicts at the Andamans, was 115,403 or 7,728 more than in 1907, and the death rate was 24·47 per thousand. The figures regarding the 14,067 convicts at the Andamans are excluded from the general statistics discussed in the following paragraphs because the circumstances of their lives differ widely from those of prisoners in the jails.

In India and Burma the mean daily prison population in 1908 was 101,336, compared with 93,264 in the previous year. In every thousand, 646 were admitted to hospital during the year and 29 were constantly on the sick list, compared with 624 and 27 in 1907. The death rate, which in the previous five years ranged from 19·50 in 1903 to 17·61 in 1904, rose to 24·17, or 6·45 per thousand more than in 1907.

Every administration except Bombay and the North-West Frontier Province shared in the increased mortality, the most striking advances in the death rate compared with 1907 being from 16·94 to 31·61 per thousand in Bengal, 18·79 to 29·80 in Madras, and 15·03 to 24·09 in the United Provinces.

The average daily number of convicted prisoners in confinement was 94,262, and among them the death rate was 24·32 per thousand, ranging from 31·96 in Eastern Bengal and Assam to 13·09 in Burma, the rates being under 20 per thousand only in Burma, the North-West Frontier Province and Bombay.

Central and District jails.

Among the appendices to Section IV* will be found two statements F and G, in which the distribution and mortality of prisoners in central and district jails during the last five years are analysed. It will be observed that in India as a whole the number of prisoners in central and district jails are nearly equal, although in the separate provinces this is not generally the case. As usual the mortality in the central jails was lower than in the district jails, and, as was to be expected in a peculiarly unhealthy year, the death rate (33·61) among prisoners recently admitted into district jails was exceptionally high. The next highest rate, 31·31, occurred among prisoners in central jails who had been in confinement between 3 and 7 years; nearly one-third of the deaths among them was due to tubercle of the lungs.

Causes of sickness and mortality.

The diseases which caused the highest rates of admission to hospital were malaria (·977 per 1,000), dysentery (76·9), abscesses, ulcers and boils (65·2) and diarrhœa (37·6); and those which caused the highest death rates were dysentery (4·67 per 1,000), tubercle of the lungs (3·76) and pneumonia (3·24).

Malaria.

Malarial fevers, although they are the commonest of the diseases and cause a great deal of suffering and loss of labour, are very seldom the direct cause of death in prison. In 1908 there were 20,039 cases of malarial fever admitted into the jail hospitals and only 105 terminated fatally. Assuming that all the recorded deaths were due to malaria and malaria only, which the records show was by no means the case, only one attack in 191 ended in death, which proves that even in a year when malaria is peculiarly severe, malarial diseases when efficiently treated—using the term in its fullest sense—are by no means fatal.

The mean admission rate in India and Burma was 197·7 per thousand, compared with 191·3 in 1907, and the death rate 1·04 compared with ·94.

The numbers of cases of malaria occurring in the jails have been steadily falling in recent years. The fall is well shown by a comparison of a series of admission rates; in the five years ending with 1893, the mean admission rate on account of malaria was 393 per thousand, in the following five years it had fallen to 320, and in the next five years to 277; in the five years ending with 1908 the rate was 199 per thousand. This is, of course, highly satisfactory, and the questions arise, "To what is the reduction in the number of malarial infections due?", and "Is the decline likely to continue?" Before endeavouring to reply to these questions we must assure ourselves that the decline is a real one, for it is obvious that changes in nomenclature and greater precision in diagnosis might be responsible for an apparent improvement. The test is, of course, the general admission rates; if we find that they have declined along with and in proportion to the admission rates on account of malaria, we may safely conclude that the incidence of malaria has been reduced. The jail statistics stand the test; the general admission rates in the four quinquennial periods were, respectively, 1028·8, 931·1, 825·7 and 650·0. In the earlier years some reduction in the number of cases returned as malaria was, no doubt, due to more careful or more scientific diagnosis, but this cause has not been effective in recent years, and although the records of fatal cases show that more care in diagnosis, particularly in the smaller jails of some provinces, is required, they also point to the probability that there are quite as many cases of other diseases erroneously ascribed to malaria, as there are cases of malaria registered under other headings.

* When a table or appendix is marked with an asterisk it refers to the standard tables or appendices of the Sanitary Commissioner's Annual Report.

Prophylaxis.

It is now a good many years since specific anti-malarial measures—the destruction of mosquitoes and the prophylactic use of quinine, have been in general use in the jails. Measures directed against mosquitoes, such as the removal of under-growth, drainage, the application of kerosine oil to bodies of water, the introduction of fish into tanks, etc., although certainly useful, can obviously be employed only within the area over which the superintendent has, or can obtain control, and their value is therefore at the best limited, while at the worst, when the country is flooded, when anopheles are breeding in every pool, and a large proportion of the people are infected with malaria, their value must be much reduced. Quinine prophylaxis is, however, always available, and its use is not affected by external circumstances, indeed, it is evidently just when these circumstances are most unfavourable that quinine becomes most useful. In the autumn of 1908, over a great part of Upper India the conditions in most places were such that limited measures against mosquitoes can have had but small effect, and such results as were obtained in the struggle with malaria were generally due to quinine prophylaxis. The history of the malarious autumn of 1908 in the United Provinces, the Punjab and the North-West Frontier Province is therefore of peculiar interest and importance.

In the United Provinces the epidemic of fever began towards the end of August and prevailed with extraordinary severity until the end of the year. "Quinine was given in most jails to all prisoners with spleen or who had suffered from fever on admission or in jail." The general admission rate among the prisoners rose from 201·0 to 281·3 per thousand, the smallness of the increase being, according to the Inspector-General, "probably owing to quinine being given more systematically." The statistics of the individual jails show that the admission rates for malaria varied enormously, from 1,203·6 in the third class district jail at Muzaffarnagar to 8·3 in the central jail at Lucknow. In the central jail at Lucknow there were only 14 admissions on account of malaria and the general admission rate 140·0 was less than one-fifth of the provincial mean, while Lucknow district and Lucknow town suffered severely from malaria. The 14 cases admitted represent only the severer cases of malarial infection, slight cases were not admitted to hospital, but no special anti-malarial measures appear to have been in force in the jail and there was no prophylactic issue of quinine. The jail is well situated at a distance of about three miles from the city and the Superintendent attributes the exemption from malaria to the general excellence of hygienic conditions.

Two "usually very unhealthy jails," at Gorakhpur and Saharanpur were selected for a special experiment in quinine prophylaxis, the drug being given in weekly doses of 15 grains to males and 10 grains to females from the 30th August to the end of the year. The results were considered satisfactory—the cases of malaria were fewer and milder than in the previous year, dysentery was less prevalent, and the general health of the prisoners, judged by their appearance and by the reduction in the death rate, was improved.

In the Punjab an experiment on a great scale was undertaken under the personal direction of the Inspector-General, Lieutenant-Colonel Braide, who spared no trouble to ensure that it should be carried out thoroughly. During the four autumn months, August to November, each new prisoner was given ten grains of quinine at the time of his admission to jail, and every prisoner was given 15 grains once a week.

The effects were very remarkable. The autumn was the most malarious in the history of the Punjab, the general fever death rate rising from 20·26 per

thousand in the preceding year to 34·66; in jails the admission rate on account of malaria *and* "pyrexia of uncertain origin" fell from 234·5 per thousand in 1907 to 173·5—a rate far lower than any previously recorded in the history of the Punjab jails. That this result was not contrived by classifying doubtful cases under headings other than malaria becomes evident when the total admission rates are examined; these rates fell from 890·5 per thousand, the mean of the five years ending with 1906, and 706·8 in 1907, to 581·2 in 1908. There was, it is true, a serious increase in the death rate, which rose from 19·81 per thousand in 1907 to 23·49 in 1908, but this increase was due to dysentery and tubercle of the lungs.

In the North-West Frontier Province in 1908 the fever death rate among the general population was less than in the previous year, but the details of the statistics show that fever was exceedingly prevalent in the autumn, especially in the Peshawar district, and that the mortality from it in the towns was exceptionally high. In this province experiments in quinine prophylaxis were carried out in two jails at Peshawar and Dera Ismail Khan. The experiments in both jails were on the same principle, three similar gangs of men were selected, to one gang no quinine was given, to the second gang five grains of quinine were given daily, and to the third gang 15 grains of quinine were given every fifth and sixth day. Very curious results were obtained. We may consider the experiment at Peshawar first, because fever was certainly more severe there than at Dera Ismail Khan. The three gangs consisted of 53 men each. To the men of A gang no quinine was given, and there were 25 admissions on account of malaria. To the men of B gang 5 grains of quinine were given daily, and there were 49 admissions on account of malaria. To the men of C gang 15 grains of quinine were given on every 5th and 6th day, and there were 53 admissions on account of malaria. The account of the experiment is too imperfect to permit of criticism or of any attempt at an explanation of the surprising fact that in this jail the effect of giving quinine in ample doses was to produce attacks of malarial fever, but it is obvious that the value of the experiment depends upon there having been no change in the personnel of the gangs—a matter difficult to arrange in a district jail. It may be noted that among the police, whose lines adjoin the Peshawar jail, the percentage of admissions from fever was four times as great as it was among the prisoners. The Inspector-General is "not, however, inclined to attribute the comparative immunity of the prisoners in the Peshawar jail entirely to the prophylactic use of quinine". He points out that, while the prisoners sleep in airy barracks which afford no cover for mosquitoes, "the rooms occupied by the policemen are swarming with these insects".

At Dera Ismail Khan a fourth gang averaging 147 men who had been admitted to prison after the 16th July, were given 15 grains of quinine every 5th and 6th day. The experiment may be most simply represented in a table.

	Gang A. (no quinine	Gang B. (5 grains quinine daily).	Gang C. (15 grains of quinine every 5th and 6th day).	Gang X. (15 grains of quinine every 5th and 6th day).
Daily average strength	56	56	56	147
Total admissions on account of malaria ...	22	4	6	29
Daily average sick from malaria ...	1·32	·43	·09	·77
Percentage sick on account of malaria ...	39·3	7·1	10·7	19·0

It appears from the evidence, whatever the value of measures taken against mosquitoes—whether to prevent their breeding or to prevent their biting—that in a very malarious year in prisons, the administration of quinine is for the present the remedy upon which reliance must be placed. Judging by the success attained in the Punjab, and generally elsewhere when special efforts were made to carry out the administration of quinine in a thorough manner, there is reason to hope that, as the prophylactic use of quinine becomes more widely adopted, the decline in the frequency of malarial infections will continue.

In discussing in 1906, preventive measures against malaria, it was suggested that the Inspector-General in each province "should lay down for each jail in his administration exactly what measures are to be carried out, the dates between which these measures are to remain in force and the precautions to be observed to guard against failure." In many quarters this seems to have been held to suggest that the Inspector-General should, without reference to the Superintendent, order indiscriminate dosing with quinine. This was not the intention, as indeed the context clearly shows. It was intended that the circumstances of each jail should be carefully considered and the means necessary and likely to be effective in preventing malaria adopted with reference to these circumstances. This can be done only by the Inspector-General who has better means of becoming acquainted with the past history and present needs of the jails under his administration than even the Superintendents. The Superintendents would of course be consulted, and it is not likely that the opinion of an experienced Superintendent would ever be disregarded.

Dysentery.

In 1907 dysentery was less common and less fatal than in any previous year; in 1908 the cases were very numerous and exceedingly severe. The number of cases rose from 6,328 in 1907 to 7,796, and the number of deaths from 240 to 473. In the earlier months of the year dysentery was rather less prevalent than usual, and it was not until July that the numbers of admissions became very large. From August until the end of the year the numbers of cases were exceptionally large and this was especially noticeable in Bengal, the United Provinces and Punjab. The disease was much more fatal than usual—the case-mortality was twice as high as in 1907; and although the admission rate rose only from 67·9 per 1,000 in 1907 to 76·9 in 1908, the death rate rose from 2·57 to 4·67, the rates in the provinces ranging from 8·54 in Bengal to ·88 in Bombay and ·74 in the North-West Frontier Province. Of the 473 prisoners who died of dysentery during the year, no less than 253, or nearly fifty-three per cent., had been less than six months in prison.

Diarrhœa.

The admission and death rates from diarrhœa also were higher than in the previous year, the former rising from 34·4 to 37·6 per thousand, and the latter from ·80 to ·94. It is noteworthy that in Madras, where the death rates from cholera (7·05) and dysentery (7·05) were exceptionally high, only 34 cases were recorded as due to diarrhœa and there was no death.

Tubercle of the lungs.

Until recently dysentery was invariably the most common cause of death in the jails, but in 1904 the death rate from dysentery was lower than the death rate from tubercle of the lungs. This change in the relative positions of the death rates was due to a decrease in the number of fatal cases of dysentery. In the following year the

death rate from dysentery was again lower than the death rate from tubercle, and this occurred again in 1907, but in 1906 and in 1908 the death rates from dysentery were the higher. In respect of prevalence among prisoners the two diseases are related to each other—that is to say, in any year in which dysentery is exceptionally prevalent in the prisons, tubercle of the lungs will be found to be exceptionally prevalent also, and in years when the numbers of cases of dysentery are comparatively small, tubercle of the lungs is also less common than usual. While, however, there has been a distinct diminution during the last decade in the prevalence and fatality of dysentery, preventive and curative measures have been less successful in the case of tubercle of the lungs.

The opinion is widely held and evidence has been brought forward to prove that tubercular disease, particularly tubercle of the lungs, is increasing in India, especially in the towns. The jail population is mainly composed of persons who have led an outdoor life before their incarceration, but it might be expected that any rapid increase in the prevalence of the disease in the country generally would be reflected in the jail statistics. In the review of these statistics in 1904, it was shown that, whatever might be the case in particular jails, there was no reason to think that tubercle was on the increase among the whole body of prisoners. If we examine the statistics for the ten years 1898—1907 we find that the general admission rate on account of tubercle of the lungs has fluctuated within very narrow limits. In 1898 the admission rate was 7·9 per 1,000, the rates then rose steadily to a maximum of 9·1 in 1901 (when the prison population was affected by the effects of the famine of the previous year), after which the admission rates fell steadily to the minimum of the ten years' period, 7·5 in 1907. The death rates followed a similar course, but the maximum occurred in 1900. In 1898 the death rate was 2·99 per 1,000, in 1900 it was 3·76, after which the rates fell irregularly, the minimum, 2·74, occurring in 1907. In comparing the admission with the death rates it appears that the case-mortality was considerably higher in the earlier part of the decennium than in the later. The lowest case-mortality occurred in 1902, and since then it has been very slightly higher and remarkably constant. It appears then that tubercle of the lungs is not increasing among the prisoners as a body, and either that cases are diagnosed at an earlier stage than formerly, or that treatment is rather more successful.

An examination of the statistics of the provinces separately yields somewhat different results; but it must be remembered that in the smaller numbers in the several administrations considerable fluctuations are to be expected. In Bengal and the Punjab admission rates and, in a less degree, death rates tend to rise; in the United Provinces death rates tend to fall, and in Madras both admission and death rates tend to fall. The figures relating to single jails, of course, fluctuate from year to year more than those relating to administrations, but in a few jails the admission and death rates have risen in recent years. This is especially noticeable in the case of the Alipore Central Jail where, particularly since 1904, the admission rates have been very high.

In those jails in which tubercle of the lungs is on the increase, special measures to prevent the spread of infection are obviously required, not only in the interests of the inmates of those jails, but in the interests of the prisoners in other jails in the administration and of the general public among

whom infected prisoners may carry the contagion of their disease when they are transferred or released.

In 1908 the admission rate on account of tubercle of the lungs was very high, 9·4 per 1,000, and the death rate, 3·76, was the highest since 1900. In that year the high death rate was largely due to the admission of many prisoners in an advanced stage of the disease; in 1908 of the 381 fatal cases no less than 122, or upwards of 32 per cent., were sent to hospital on account of tubercle of the lungs within three months of their admission to jail, 49 of them within a week. Most of those who died had been only a short time in prison, only 91, or 24 per cent. of the deaths occurring among prisoners who had been in confinement for more than three years.

Pneumonia.

In 1904 there was a remarkable decline in the prevalence of pneumonia; the admission rate, which had always been over 13 per 1,000, fell to 10·7, and the death rate, which had always been over 3 and frequently over 4 per 1,000, fell to 2·79. In the following two years the improvement was more than maintained, but in 1907 the admission rate rose to 11·5 and the death rate to 2·90. In 1908 the admission rate rose to 12·4 and the death rate to 3·24 per 1,000. The seasonal distribution of the disease was abnormal, the numbers of cases occurring in January, March and October being much greater than usual, mainly owing to the extraordinary frequency of the disease in the United Provinces in those months. The death rates in the several administrations ranged from 4·91 per 1,000 in the United Provinces to 1·0 in the Central Provinces.

Anæmia and Debility.

In 1908 there were 1,194 cases and 56 deaths ascribed to anæmia and debility compared with 1,048 cases and 42 deaths in the preceding year. The Nomenclature of Diseases no longer contains a heading "old age" and deaths considered by medical officers to be due to that condition are returned under anæmia and debility.

Cholera.

There were 337 cases of cholera and 170 deaths, compared with 140 cases and 55 deaths in 1907. The administrations which suffered most were Madras and Bengal. In Madras the cases numbered 150 and the deaths 74, equal to a death rate of 7·05 per 1,000. All the deaths except three occurred in the four northern jails where the prevalence and severe mortality from the disease are attributed by the Inspector-General to conditions of famine among the people. In Bengal there were 113 cases and 57 deaths, equal to a death rate of 3·98 per 1,000. In contrast to Madras the disease appeared in no less than 16 jails and in one subsidiary jail. The largest numbers of deaths in the several jails being nine each in Bankipore and Naya Dumka, eight in Angul and seven in Gaya.

Small-pox, Plague and Enteric Fever.

There were 122 cases of small-pox and 15 deaths equal to a death rate of ·15. The highest provincial death rate was ·50 in the Central Provinces where there were three cases and two deaths. There were ten cases of plague and five deaths compared with 50 and 30 in 1907. There were 113 cases ascribed to enteric fever of which 36 terminated fatally. In 21 jails two or more cases were recorded. In all but four of the fatal cases the post-mortem appearances confirmed or supported the diagnosis.

Bengal.

Climatic conditions in Bengal during 1908 were abnormal chiefly in the early cessation of the monsoon rains and the large defect in the rainfall from October to the end of the year. The dry autumn may have tended to diminish the prevalence of malarial fevers, but throughout the province cholera was rife and this together with conditions of scarcity in a number of districts made the year as a whole an unhealthy one. The effect of the unfavourable conditions upon the health of the jail population was enhanced by the serious overcrowding which resulted from a great increase in the number of prisoners, the admissions to jail having risen from 78,891 in 1907 to 101,000 in 1908 and the daily average strength from 14,408 to 15,565. As there is accommodation in the 37 central and district jails for only about 15,200 prisoners of both sexes and all classes it is not surprising to find that according to the reports of medical superintendents no fewer than 30 jails were more or less seriously overcrowded during a part or the whole of the year.

The striking feature of the vital statistics is a great increase of mortality in the absence of a corresponding increase in the amount of sickness. The rate of admission to hospital was only 930 per thousand as compared with 938 in 1907, and the incidence of such important causes of sickness as malaria, pneumonia, and respiratory diseases was considerably diminished, but the death rate rose from the comparatively low rate of 16·94, to 31·61 per thousand and there were no fewer than 492 deaths as compared with 244. The increased mortality was due almost entirely to the unusually large numbers of deaths from dysentery, tubercle of the lungs, cholera, and "anæmia and debility." Dysentery caused 133 deaths as against 41, tubercle of the lungs 78 as against 45, cholera 62 as against 5 and anæmia and debility 15 as against 6. Excepting cholera, of which there were 121 more cases in 1908 than in 1907, the admission rates from the above diseases were not very markedly higher in the year under review than in the previous year, the greater number of deaths being due chiefly to their much greater fatality. So far as can be judged from the reports of the Inspector-General and of medical superintendents it appears that the most important causes of the high case-mortality were the serious degree of overcrowding which existed in almost all jails and the fact that as a result of conditions of scarcity or famine the prisoners admitted to a number of the jails were broken down in health and very feeble. The prevention of the diseases mentioned is rendered more difficult by the absence from all except 14 jails of separate hospital accommodation for cases of infectious disease.

Cholera which was exceedingly prevalent among the general population of the province was introduced into 16 jails, but it was prevented from attacking more than one or two prisoners in all except six. The largest number of admissions from it in any jail was thirty at Naya Dumka. From malarial fevers the admission rate declined from 347 to 248 per thousand and the death rate from 1·04 to ·84, the admission rate being the lowest since 1896 and the death rate is the lowest on record. The prophylactic use of quinine is systematically carried out. The industry of making up pice-packets and tablets of quinine for use in the province generally has been transferred to the prison for juveniles recently opened at Alipore, and more than four million packets were made up and despatched to various post offices during the year.

Eastern Bengal and Assam.

The number of prisoners who passed through the jails of Eastern Bengal and Assam during 1908 was nearly the same as during 1907, but the average daily strength fell from 7,310 to 7,118. There was overcrowding during part of the year in 21 of the 25 jails; in the Dacca central jail it was considerable throughout the year. The chief feature of the climatic conditions was a marked deficiency of rainfall, especially in Eastern Bengal, from June until the end of the year, the monsoon rainfall in that portion of the administration being 21 per cent. in defect of the normal and the rainfall from October to December 53 per cent. in defect. The rate of admission to hospital rose from 861 per thousand in 1907 to 917 and the death rate from 29·55 to 31·89, the mortality from all the principal diseases being increased. The admission rate from malaria was 283 per thousand as compared with 257 in 1907, but the increase was due to an unusual prevalence in a few jails, the admission rates in the majority being lower than in the previous year; and there were only nine deaths from the disease as compared with 19 in 1907. In the jails as a whole there was a slight decrease in the prevalence of dysentery, but 60 deaths occurred as compared with 53 in 1907, and in some jails such as Noakhali, Rangpur, Mymensingh, Rampur Boalia and Dacca the disease was severely prevalent.

Among the larger jails death rates over 40 per thousand were recorded at Rangpur (97·46 per thousand), Gauhati (51·95), Rampur Boalia (49·81) and Dinajpur (43·48).

United Provinces.

Climatic and other conditions were very unfavourable to the health of the inhabitants of the United Provinces in 1908, and the effect was evident in an increased amount of sickness and mortality among the jail population. Until the end of May the rainfall was not far removed from the normal and in June the rainfall was generally below the average. The monsoon rainfall was irregularly distributed, in the west of the province, the total amount was just over the average, but it all fell within two months, in the east of the province the amount was in considerable defect. Prices of food grains were exceedingly high throughout the year, wheat for the jail population being bought on an average at only 8 seers and 10 chitaks per rupee as compared with 12 seers and 4 chitaks in 1907, and gram at 9 seers and 2 chitaks as compared with 15 seers and 15 chitaks. The provinces were visited in the autumn by an epidemic of malaria of exceptional severity.

The daily average strength of the prisoners rose from 23,887 in 1907 to 28,308. According to the reports of medical superintendents there was overcrowding for periods varying from a few days to the whole year in 36 of the 56 jails in this administration. From the middle of August to the beginning of December the old reformatory at Bareilly was used, with the object of avoiding overcrowding in the jails, to accommodate about 200 short term prisoners.

The rate of admission to hospital rose from 603 per thousand in 1907 to 679, and the constantly sick rate from 29 to 31, but, as in several other administrations, the most striking feature of the statistics is a rise in the death rate out of proportion to the increase in the amount of sickness. The rate was 24·09 per

thousand as compared with 15·03 in 1907, the total number of deaths being 682 as compared with 359. There was an increase in the mortality from all the chief diseases but it was greatest as regards dysentery, pneumonia, and tubercle of the lungs. Until August dysentery was not much more prevalent than in 1907, but during the last five months of the year it caused 880 admissions to hospital and 84 deaths, as compared with 516 admissions and 27 deaths in the same period of 1907. The seasonal prevalence was very similar to that of malaria and in two jails, Gorakhpur and Saharanpur, which, on account of their unhealthiness in most years, had been selected for a rigid trial of quinine as a prophylactic of malaria, it appeared to the medical superintendents that the administration of the prophylactic doses had a marked effect in reducing the number of cases of dysentery as well as of malaria. In the Gorakhpur jail during the last four months of the year (the period during which quinine was administered) the statistics show only 14 admissions to hospital for dysentery as compared with 35 during the previous four months and 34 during the first four months. Perhaps the great deficiency of the rainfall in the Eastern portion of the provinces, where Gorakhpur is situated, may have tended to reduce the prevalence of dysentery in this jail, but against this view may be set the fact that in some other jails in the same area (such as Ghazipur) dysentery was exceedingly prevalent and fatal. In all the jails pneumonia caused 139 deaths as compared with 82 in 1907. There were 270 cases during the first half of the year and 246 during the second half. The admission rate from tubercle of the lungs was 8·2 per thousand and the death rate 2·79, as compared with rates of 5·4 and 1·67 in the previous year. The highest rates were recorded in the jails at Etah, Dehra Dun, and Bijnor. Malaria caused 41 per cent. of the total admissions to hospital during the year as compared with 33 per cent. in 1907. The admission rates varied enormously in different jails, but in 40 jails they were higher and in 16 jails lower than in 1907. The highest rates per thousand were 1,481 in Mainpuri, 1,203 in Muzaffarnagar, and 1,100 in Bulandshahr, and the lowest 8 in the Lucknow central jail, 27 in Mirzapur, 46 in the Lucknow district jail, 60 in Rai Bareli, and 65 in the Allahabad central jail. The number of deaths increased from 21 to 44. The Inspector-General considered that in comparison with the free population the prisoners escaped the disease to a very considerable extent probably owing to the prophylactic use of quinine in most jails. The good results of this measure at Gorakhpur and Saharanpur, which are specially mentioned as the jails where it was carried out systematically under the supervision of the medical superintendents, have already been referred to. The death rate from all causes in the first of these two jails fell from 38·89 per thousand in 1907 to 20·87 and in the second from 53·10 to 34·21.

Punjab.

The unusual abundance of the monsoon rainfall in the Punjab from July to September was followed by a very unhealthy autumn, but as regards the prison population the success attained in counteracting the influences of adverse climatic conditions is a noteworthy feature of the year. The number of jails was the same as in 1907 and with an increase of about 2,000 in the number of persons imprisoned and a rise in the daily average population from 11,154 to 11,919 there was overcrowding in seven jails. In some districts the homes of many people were destroyed by floods and this as well as the high price of food may have helped to fill the prisons. A year characterised by adverse climatic and other conditions is one in which the efforts of medical superintendents to

counteract the influence of such conditions can be well tested, and as regards the prison population of the Punjab the success attained was great. The rate of admission to hospital was only 581 per thousand as compared with 707 in the previous year and the constantly sick rate only 26 as compared with 30. The deaths, however, numbered 280 as compared with 221 the rates per thousand being 23·49 and 19·81 respectively. This increase was due entirely to the greater prevalence of and mortality from tubercle of the lungs, dysentery, and pneumonia. On the other hand the statistics of malaria, another disease greatly influenced by climatic conditions, show in a remarkable manner the effect of the control exercised by medical superintendents upon the incidence of preventable disease. In many parts of the Punjab the autumn was the most malarious of which there is record, but, as a result of the thorough manner in which the prophylactic administration of quinine was carried out, the prisoners enjoyed a remarkable immunity, the admission rate being only 164 per thousand as compared with 232 in 1907 and 365 the mean rate for the years 1902-06. There were only five deaths ascribed to malaria during the year and in none of these was the fatal issue due to malaria alone. A special report on the protection from malaria afforded to the prisoners by the use of quinine has been written by the Inspector-General, Lieutenant-Colonel Braide, I.M.S., and widely circulated. Tubercle of the lungs caused 154 admissions to hospital and 70 deaths as compared with 118 admissions and 43 deaths in 1907. In the Montgomery central jail there were 62 admissions with 27 deaths and in the Lahore central jail 20 admissions with 13 deaths. The former jail was overcrowded throughout the year and is not yet provided with a special ward for the segregation and treatment of tuberculous patients. There is a special ward in the latter jail as well as in the jails at Rawalpindi and Multan (central and district). The Inspector-General advocates the provision of a special prison for tuberculous patients. Dysentery caused twice as many deaths as in 1907, September and October being the months of greatest prevalence. Four cases of plague occurred during the year and there were five cases of cholera with one death, and 16 of small-pox with two deaths. Thirteen prisoners were released on medical grounds as compared with eight in 1907.

North-West Frontier Province.

The average strength of the population in the five prisons of the North-West Frontier Province during 1908 was 1,345 as compared with 1,183 in the previous year, the increase being attributed to the increase of crime which usually follows a rise in the price of food. All the jails were overcrowded during a portion of the year, the periods of overcrowding varying from 28 days at Dera Ismail Khan to 214 at Peshawar. The exceptionally heavy rainfall of the year was unfavourable to the health of the free population; among the prisoners, however, the rate of admission to hospital was only slightly higher than in 1907 and the death rate was only 15·61 per thousand, which is less by 2·14 than the rate of that year. Malaria was very prevalent in the Peshawar jail, the admission rate being 1,247 per thousand as compared with 559 in 1907, but there was no death from the disease in this jail and only two from it in the other jails. From all causes there were 21 deaths in the five jails, the number being the same as in the previous year. Six of the deaths were due to pneumonia, three to respiratory diseases, one to tubercle of the lungs and one to dysentery. Although cholera was prevalent in the province, no case

occurred among the prisoners. In the Peshawar jail a small outbreak of typhus fever, causing six cases and one death, occurred in March. The hospital appeared to be the place where infection was contracted and there was reason to think that bed bugs, which were abundant in the corners and joints of the iron bed-steads, were carriers of the infection. In addition to adopting the usual measures of isolation and disinfection, all bed bugs were killed by placing the bed-steads in fires made by burning dried leaves. The outbreak ceased shortly afterwards.

Central Provinces and Berar.

With an increase in the average daily strength of the prisoners in the Central Provinces from 3,241 in 1907 to 4,013 in 1908, there was occasional or continuous overcrowding in 13 of the 21 central and district jails. The monsoon broke about the middle of June and gave good rain in all districts. The rainfall was heavy and continuous in July and August and until near the end of September, the amount being 6 per cent. in excess in the west of the Central Provinces; 20 per cent. in excess in the east and 24 per cent. in excess in Berar. The admission, constantly sick and death rates were all considerably higher than in 1907. Malaria, abscesses, and dysentery were the principal causes of sickness, and dysentery, tubercle of the lungs, and respiratory diseases the principal causes of death. The admission rate of malaria rose from 160 per thousand in 1907 to 239, and that of dysentery from 34 to 45. In all except the central jails at Jubbulpore, Raipur, and Nagpur, the average annual strength is too small to permit of fair comparison between the rates in different jails, but it may be said that the highest admission rate from malaria was recorded in the Nagpur central jail which is in the area where the excess of the monsoon rainfall over the normal was least. In this jail the disease caused 461 admissions to hospital and one death. On the other hand in the Amraoti and Akola jails in Berar, where the monsoon rainfall was 24 per cent. in excess of the normal, the admission rates from malaria were only 17·8 and 90·4 per thousand respectively. An attempt to carry out a systematic experiment to test the value of quinine as a prophylactic of malaria was without definite result. Tubercle of the lungs caused in all the jails 40 admissions to hospital and 16 deaths, of which seven occurred in the Nagpur central jail and three in the Raipur central jail. Three cases of small-pox occurred during the year; there was no case of cholera or plague.

Madras.

The jails at Mangalore and Russellkonda were reduced to the status of sub-jails during 1908, so there are now only eight central and six district jails in the Madras administration. The year was an unfavourable one, for cholera was prevalent in a number of districts, and although the monsoon rainfall was practically normal there was a serious deficiency of rainfall from October to December, the prices of food grains were high, and the effects of scarcity were apparent in the Northern Circars. Partly as a result of conditions of scarcity there was a considerable increase in the number of admissions to jail, and, with an increase in the daily average strength from 10,166 to 10,638, seven jails were more or less overcrowded during the year. The rate of admission to hospital rose from 376 per thousand in 1907 to 443, and the death rate from 18·79 to 29·80, cholera, dysentery, tubercle of the lungs and "anæmia and debility" being the diseases which mainly contributed to the greatly

increased mortality. The different jails shared very unequally in the increase of sickness and mortality, and although in only two jails (Coimbatore and Tanjore) were both the admission and death rates lower than in 1907, there were out of the 16 jails five in which the admission rate was lower than in that year and seven in which the death rate was lower. Cholera appeared in six jails and accounted for 152 cases and 75 deaths, as compared with 106 and 39 in 1907. Sixty-eight of the cases occurred in July and 53 in August. In proportion to population Russellkonda, with a death rate from this disease of 200 per thousand, was the jail most severely affected, but most cases and deaths (64 and 24) occurred in the Rajahmundry central jail. Dysentery caused an admission rate of 64 per thousand and a death rate of 7·05, as compared with rates of 57 and 2·85, respectively, in 1907. No jail was entirely free from the disease, but the jails at Rajahmundry, Vizagapatam, Berhampur, and Russellkonda situated in the scarcity area (to which cholera was almost confined), were among those with the highest admission rates. August was the month in which most cases occurred, but in several jails the numbers of admissions in each month of the year were almost equal. The case-mortality rose from 4·7 per cent. in 1907 to 10·6 per cent. The death rate from tubercle of the lungs rose from 2·46 to 3·20 per thousand, only five jails being without a death from this disease. There are specially constructed wards for the treatment of tuberculous patients on the open air system at Trichinopoly and Bellary, and in several other jails there are wards set apart entirely for such cases.

Bombay.

The daily average population of the 17 prisons in Bombay increased from 7,537 in 1907 to 7,930 in 1908, and seven of the prisons were overcrowded for a considerable part or the whole of the year. Four of the remaining prisons were overcrowded for short periods. The admission, constantly sick and death rates were 654, 33, and 18·16 per thousand, respectively, as compared with 693, 32, and 20·56 in 1907, the death rate being, with the exception of that in 1905, the lowest on record. Cholera was prevalent among the free population of the province during the year, and severe outbreaks of malarial fever followed disastrous floods in Hyderabad, but only one death from the former disease occurred among the prisoners, and the admission rate from the latter was only 126 per thousand as compared with 178 in the previous year. The decrease in the prevalence of malaria was most marked in the Yerrowda central prison, where there were only 272 admissions as compared with 673 in 1907. Quinine prophylaxis was carefully carried out in this jail and in some others, the decrease being attributed generally to this measure. It was attributed to anti-mosquito measures in only one jail, Rajkot, in regard to which it was said: "a weekly mosquito inspection has been made and it appears reasonable to ascribe to this the almost complete absence of admissions to hospital for malaria." The average population of the jail was only 80. Pneumonia and tubercle of the lungs were, as usual, the principal causes of death among the prisoners in this administration, the former disease being most prevalent and fatal among convicts in the Sind gang. The prisoners in this gang are employed on railway work, and during the year under review were exposed to unusual hardship on account of the destruction of their temporary barracks by heavy rainfall in July. A new hospital for cases of pneumonia in this gang has been built. Tubercle of the lungs caused 52 admissions to hospital and 24 deaths, as compared with 44 admissions and 19 deaths in 1907. The largest

number of cases and deaths (21 and 9) occurred in the Yerrowda central prison. In seven jails no case was recorded, and the Deccan and Sind gangs, both of which are engaged entirely in extra-mural labour, were also free from the disease. Two outbreaks of cerebro-spinal fever occurred in the Hyderabad central prison and caused in all 15 cases with 12 deaths.

Burma.

In Burma the monsoon rainfall of 1908 was normal and favourably distributed, but the rainfall from October until the end of the year was greatly in excess. This was unfavourable to health, and the steady almost yearly decrease in the sickness and mortality which has become a striking characteristic of the vital statistics of prisoners in this administration was interrupted. The average daily strength of the jail population was 13,871, as compared with 13,721 in 1907, the rate of admission to hospital was 277 per thousand, as compared with 256, and the death rate was 13·27, as compared with 11·88. Abscesses, malaria, and dysentery were the principal causes of sickness, and tubercle of the lungs, dysentery, and pneumonia the principal causes of death. The admission rate from malaria fell from 36·4 per thousand in 1907 to 35·6, and only seven deaths from this disease were recorded, the admission rate being, as usual, much lower than in any other administration. In the jail at Sandoway no case of malaria occurred, and there was only one case in each of five other jails, among which is included Henzada, where more than 1,800 prisoners were received during the year. In this jail prophylaxis by the administration of quinine was carefully carried out during the whole year. Dysentery caused 269 admissions to hospital, as compared with 275 in 1907, but there were 19 deaths as compared with only ten in that year. A case or cases occurred in 22 of the 30 jails, the largest number (96) being in the Myingyan central jail. In 17 jails there was no death from the disease. There were 106 cases of tubercle of the lungs with 47 deaths, as compared with 67 cases and 42 deaths in 1907. The difficulty of disinfecting clothing and blankets used by tuberculous patients has been overcome by the installation of a Thresh's disinfector in each central jail. Nine jails were entirely free from both tubercle of the lungs and pneumonia during the year. Cholera caused 17 admissions with 11 deaths, and plague three admissions with two deaths. Rat killing was carried on, and the store rooms for grain in all jails have now been made rat-proof.

The old jail at Moulmein was vacated and the new one occupied on the 14th of November 1908.

Ajmer, Mercara, Quetta and Secunderabad.

There was no overcrowding in the jail at Ajmer during 1908. The water-supply from the jail wells during the first nine months was deficient and had to be supplemented by purchase of Foy Sagar (municipal pipe) water. The average annual strength of the prisoners was 359 and 123 admissions into hospital and five deaths occurred during the year, giving ratios of 342·6 and 13·93 per thousand, respectively, compared with 431·5 and 15·50 in 1907. In the Mercara jail, where the average annual strength was 92, there were six deaths during the year, two of which were due to pneumonia. At Quetta, where the average strength was 51, there was no death, and at Secunderabad (average strength 85) there were two deaths during the year, one from pneumonia and one from dysentery.

Andamans.

The conditions in which convicts in the Andamans live render it impossible, under existing arrangements, for the supervision of all matters relating to labour, dieting, and health to be so thorough as in Indian prisons, with the result that the statistics of sickness and mortality among these convicts contrast unfavourably with those of convicts in India. The reduction of the age limit for transportation to 40 years, the more stringent rules regarding the selection of convicts for transportation, and improvements in the sleeping accommodation have resulted in a great diminution in the deaths among new arrivals to the settlement, and this has made the death rate for convicts as a whole appear more favourable, but among men of more than one year's residence the statistics of health are still very unsatisfactory. The average strength of the convict population during 1908 was 14,067, or 404 less than in 1907, and there was no overcrowding, except in the hospitals, during the year. The monsoon rainfall was abnormally heavy, but it is not apparent that the excess was markedly unfavourable to health for the rate of admission to hospital from all causes was only 1,439 per thousand compared with 1,903 in the previous year, and malarial fevers, pneumonia, respiratory diseases and scurvy were all considerably less prevalent. The admission rate from dysentery was one per thousand higher than in 1907, and from tubercle of the lungs it was 2·3 per thousand higher. The latter disease caused 100 deaths as compared with 75 in 1907, and to the greater mortality from this disease was due almost entirely the rise in the general death rate from 23·59 per thousand in 1907 to 26·66 in 1908. Dysentery and pneumonia were the other most important causes of death in the settlement, the former causing 61 deaths and the latter 58, compared with 45 and 62, respectively, in 1907. A noteworthy feature brought out in the statistics of the settlement is the good health of the convicts in what is called the "Jail district" compared with that of convicts in the Eastern and Western districts. It suggests that if all the convicts could be subject to closer medical control the amount of sickness and mortality in the settlement would be much reduced.

The General Population.

(For Statistical tables, *see* pages 167 to 170.)

Births in British India.

The populations among which births and deaths were registered in 1908 numbered 226,409,600, and the number of births recorded among them during the year was 8,554,427, compared with 8,505,563 in 1907. The birth rate was 37·78 per thousand, compared with 37·65 in 1907, and a quinquennial mean of 39·23. By far the highest birth rate was 52·84 per thousand, recorded in the Central Provinces. In only three other provinces were the rates over 40 per 1,000, namely, Ajmer-Merwara, 42·48, Eastern Bengal and Assam, 41·14, and the Punjab, 41·8. In only the small province of Coorg was the rate below 30; there the low rate, 24·17, is due to exceptional conditions, among them the small proportion of females in the population. In the other provinces the rates varied between 37·46 in the United Provinces and 32·4 in Madras. In all provinces, except Bengal and the United Provinces, the birth rates of 1908 were higher than those of 1907, and in all provinces, except Bengal, the United Provinces, the Punjab and Coorg, the births recorded were more numerous than the deaths, the excess being most noteworthy in the Central Provinces (14·72 per thousand), Eastern Bengal and Assam (10·40) and Bombay (8·57). The percentage of male to female births varied from 123·6 in the North-West Frontier Province to 104·03 in the Central Provinces and Berar and 101·43 in Coorg.

Deaths in British India.

The total number of deaths registered was 8,653,007, compared with 8,399,623 in 1907 and a five years mean of 7,680,007. The death rate was 38·21, or 1·03 per thousand higher than in 1907 and 4·25 higher than the mean death rate of the previous five years. In the different provinces the rates ranged from 52·73 per thousand in the United Provinces to 26·2 in Madras. In all provinces except Bombay, the Punjab, the Central Provinces and Coorg the death rates were higher than in 1907, and in all provinces except Eastern Bengal and Bombay they were higher than the quinquennial means. In all provinces except Bengal, Eastern Bengal and Assam, the United Provinces, the Central Provinces and the North-West Frontier Province the urban death rates were higher than the rural, and in all provinces, save the United Provinces, the Punjab, the North-West Frontier Province, Coorg and Ajmer-Merwara the death rates of males were higher than the death rates of females.

In India as a whole the lowest death rate was registered in July, and this was the month in which the lowest rates were registered in the United Provinces, the Punjab, the North-West Frontier Province, Ajmer-Merwara, and the Central Provinces. The highest death rate was recorded in November, when the highest mortality occurred in the United Provinces and the North-West Frontier Province.

Cholera was present in every province except Ajmer-Merwara, and was severe in Bengal (death rate 5·32 per thousand) and Madras (3·9). Small-pox was more prevalent than in 1907, especially in Northern India, and rates of over ·5 per

thousand were recorded in six provinces, including rates of 1·81 in Ajmer-Merwara, 1·42 in the Punjab and 1·26 in the United Provinces. Compared with 1907 there was an enormous reduction in the mortality from plague throughout the country, the most conspicuous falls in the death rates being in the Punjab from 30·27 per thousand to 1·53, in the United Provinces from 6·90 to ·48 and in Bombay from 5·06 to 1·48. In Madras the plague death rate of ·1 per thousand remained unchanged and there was a rise in the comparatively low rates recorded in Ajmer-Merwara and Coorg. Owing to the severe epidemic of malarial fever in the autumn the fever death rates in the United Provinces (41·31), the Punjab (34·66) and Ajmer-Merwara (30·79) were exceptionally high. A reference to Table XII of this report will show that in a few provinces the death rates under "all other causes" vary inversely with those under fever. The death rates registered under dysentery and diarrhœa and under respiratory diseases, as usual, vary greatly in the different provinces, the variation being due in most cases rather to defect in registration than to the varying prevalence of the diseases.

Bengal.

A legacy of high prices from the preceding year, defective and irregularly distributed spring rains, and the premature cessation of the monsoon resulted in conditions which were very unfavourable to the public health. The birth rates were generally low, and the death rates from cholera and bowel complaints owing to scanty and polluted water-supplies and the use among the poorer classes of unsuitable food were higher than usual.

Among the 50,528,446 people who constitute the census population under registration in Bengal there were recorded in 1908 a total of 1,823,716 births, equal to a rate of 36·09 per mille, compared with 37·70 in 1907 and 38·90, the mean of the previous five years. The highest district birth rates were 44·68 per thousand in Muzaffarpur, 43·85 in Champaran and 42·44 in Sambalpur, while excluding the urban district of Calcutta, where the rate was only 20·10, the lowest rates were 30·30 in Hooghly, 28·76 in Birbhum and 26·31 in Burdwan.

In only two of the 128 towns, Jamalpur (58·02) and Sahibganj (55·43), were the birth rates over 50 per thousand, while in no less than 84 the rates were below 25, the lowest rate being 6·96 in Tittaghar.

The percentage of male to female births was 105, the district percentages ranging from 109 in the 24-Parganas and Purnea to 101 in Singhbhum.

The deaths registered numbered 1,948,313, and the death rate was 38·56 per thousand, compared with 37·72 in 1907 and a mean of 35·53 in the previous five years. The death rate was 2·47 per thousand higher than the birth rate in the province generally, and in 17 of the 33 districts the deaths outnumbered the births.

In all the districts of Chota Nagpur, and most of the districts of Orissa and Burdwan, the birth rates were exceptionally low and the death rates exceedingly high. The highest district death rates were 67·44 in Balasore, 59·45 in Palamau and 59·11 in Puri, in all of which cholera was terribly prevalent; the lowest death rates were 29·31 in Howrah, 28·63 in Darbhanga and 26·44 in the 24-Parganas. In rural areas the mean death rate was 39·06 per thousand

compared with 31·20 in the towns, in which it is said improved sanitation is now exercising an appreciable effect. Among the towns by far the highest death rate was 94·25 recorded in the small Sonthal town of Dumka, where cholera and small-pox were very severe. The next highest rate was 59·83 registered in Roserha in Darbhanga and 57·73 in Gaya, the high mortality being due to plague in the former and to cholera, small-pox and fevers in the latter. No town was entirely free from cholera at one time or another during the year. The highest monthly death rate in the province as a whole occurred in June, and the lowest in October. Hindus died at the rate of 39·53 per thousand, Muhammadans at the rate of 34·22, and "other classes" at the rate of 40·52; the death rates of Christians and Buddhists were 27·74 and 30·71 per thousand, respectively.

The death rates of male and female infants reckoned on the number born during the year were 226·0 and 212·8 per thousand, respectively; and male children between one year and five years of age died at the rate of 59·97, while females died at the rate of 53·30. At all age periods the male death rates were the higher, the general death rate of males being 40·61 and of females 36·54 per thousand.

Registration by a professional agency.

The experiment of testing the accuracy with which deaths are at present registered in rural areas in Bengal was continued in the Galsi *thana* of the Burdwan district during the year ending the 31st July 1909. The population of the area, which was ascertained by a special census to be 53,277 at the beginning of the enquiry in August 1906, was found at a similar census taken on the 1st of August 1908 to have fallen to 50,973. The results obtained during the first and second years of the enquiry were given in this section of these reports for 1906 and 1907, and those for the third year are set forth in the same form in the following statement:—

	Cholera.	Small-pox.	Plague.	Fever.	Dysentery and diarrhœa.	Respiratory diseases.	Injuries.	All other causes.	Total.
Number of deaths recorded in the *thana* register	138	8	...	995	59	27	10	264	1,501
Number of deaths according to the investigation	142	10	...	423	157	426	11	321	1,490
Ratio per thousand according to the results in the *thana* register,	2·71	·16	...	19·52	1·16	·53	·20	5·18	29·45
Ratio per thousand according to the results of the investigation.	2·78	·20	...	8·30	3·08	8·31	·22	6·30	29·23

Eastern Bengal and Assam.

The cold weather rainfall was in defect in Assam and somewhat above the average in Eastern Bengal; the hot weather rainfall was in defect in both areas. The monsoon was weak and retreated early, and although the rainfall was approximately normal in Assam, it was seriously deficient in Eastern Bengal. Prices although lower than in 1907 were higher than normal; but it is stated that the high prices and scarcity produced no ill effect on the public health.

The population under registration, excluding certain hill tracts, numbered 29,812,735, and among them 1,226,602 births were registered. The birth rate was 41·14 per thousand, compared with 37·01 in the previous year and 38·56 the mean of the previous five years. No special explanation of the increase in the birth

rate is given in the provincial report, but details showing how defective is the registration of births, not only in rural areas but in areas where registration is intended to be compulsory, show that a possible explanation is improved registration. The birth rates in 1908 were higher than in 1907 in every district in the province, and in all except Bakarganj, Rajshahi, Pabna and Malda they were higher than the quinquennial mean. The highest district rates were 52·40 per thousand in Goalpara, 46·97 in Noakhali, and 45·77 in Bogra, and the lowest were 34·77, 33·94 and 31·29 in Lakhimpur, Pabna and Sibsagar, respectively. The mean rate in rural areas was 41·49 per thousand compared with 25·08 in the towns, the extreme rates in the latter being 51·40 in Barpeta and 2·29 in Jhalakati. The mean percentage of male to female births was 107; in the districts the percentages ranged from 109 in Bakarganj, Pabna and Lakhimpur to 104 in Rajshahi, Goalpara and Darrang.

The recorded deaths totalled 916,546, and the death rate was 30·74 per thousand, compared with 29·30 in 1907 and 31·60, the mean of the previous five years. The highest district death rates were recorded in Darrang, 51·40 per thousand, Sibsagar, 44·73 and Jalpaiguri 43·11; in these districts and in Lakhimpur (40·77) the numbers of deaths registered were larger than the numbers of births. Cholera was severe in Darrang, Sibsagar and Lakhimpur; in Jalpaiguri the high death rate was mainly due to fever, but cholera was unusually prevalent there also. The lowest district death rates were 24·10, 23·93 and 19·97 recorded, respectively, in Dacca, Tippara and Mymensingh. The rural death rate was 30·92 compared with 22·23 in the towns. In a few of the towns on or near the river the death rates were very high owing to the prevalence of cholera, notably in Tezpur (57·26), Golaghat (46·62), Sibsagar (43·06), and Dibrugarh (42·49).

Muhammadans and Hindus died at the rates of 30·53 and 29·85, respectively, and Christians and Buddhists at the rates of 26·21 and 24·26, while "other classes" died at the rate of 53·64. The rates among "other classes" were extraordinarily high in Cachar, Sylhet, Sibsagar and Lakhimpur.

Male and female infants died, respectively, at the rates of 194·5 and 175·2 per thousand born during the year; and boys and girls between one year and five years of age at the rates of 41·45 and 36·64 per thousand of the census population at these ages. In the age periods 15-20, 20-30 and 30-40 the death rates of females were higher than the death rates of males, but in all other age periods the rates of males were the higher, the general death rates being 31·75 among males and 29·69 among females.

Tea-gardens.

The mean annual strength of the coolies employed on tea-gardens in Assam during the year ending the 30th June 1909, increased from 712,002 to 747,812. Of the total labour force 36·76 per cent. were employed in the Surma Valley and 63·24 per cent. in the Assam Valley against 37·17 and 62·83 per cent. in the previous year.

The birth rate for the year was 22·7 per thousand of the total population, and 75·1 per thousand of the adult female population compared with 27·6 and 90·0 per thousand respectively in 1907-08. The corresponding provincial ratios for the calendar year 1908 were 41·14 and 193·0 per thousand.

The registered death rate increased from 29·2 to 34·3, the total number of deaths being 25,630. The provincial registered death rate for the year 1908 was 30·74 per mille.

The principal causes of deaths were dysentery (5,628), malarial fever (3,149), cholera (2,905), respiratory diseases (2,743), anchylostomiasis

(2,674), and diarrhœa (2,130). The death rate among coolies from all recruiting areas showed an increase.

Of a total of 733 gardens 63 were brought on the unhealthy list, (*i.e.*, with a death rate of over 70 per mille among the garden population as a whole, or among the act or non-act population taken separately, all number of deaths being not less than 10). In the preceding year 28* of the 731* gardens were declared to be unhealthy.

There were 75 deaths, including 50 from cholera, among coolies journeying to the Assam Valley, against 713 in the previous year. No death was reported among coolies in transit to the Surma Valley.

United Provinces.

In view of the extraordinary epidemic of malarial fever in these provinces in the autumn of 1908, details regarding the rainfall are of special interest, and it is unfortunate that a general sketch of the conditions must always fail to convey a correct idea of what took place in particular localities. In the second week of January there was favourable general rain throughout the province, and in the end of the month a good deal of rain fell in the districts in the north and west. Early in February there was again fairly general rain, but from then until the monsoon the rainfall was slight in amount and local in character, and the weather was hotter and drier than usual. The monsoon was not fully established until the 1st July in the west of the province and not until the middle of the month in the east. The rainfall in August was in defect in the east, and in excess in the west of the province. In the first week of September there was light or moderate rain in all districts, and this was the last rain that fell in the Agra and Meerut divisions. In the more easterly districts more rain was received in September, and there were a few falls in October. November and December were drier than usual.

The number of births registered during the year was 1,786,702, equal to a birth rate of 37·46 per thousand, which is 3·72 per thousand less than in 1907 and 5·63 per thousand less than the quinquennial mean. The cause of the decline, which, compared with the mean, was common to every district in the province, except Hamirpur, Banda, Jalaun and Jhansi in the south and Azamgarh in the east, is stated by the provincial Sanitary Commissioner to have been probably a result of scarcity and high prices. The highest district rates were 61·28, 59·99 and 48·78 per thousand, registered in Jhansi, Hamirpur and Jalaun, respectively, and the lowest were 27·36, 27·07 and 25·12 registered in Bara Banki, Bahraich and Dehra Dun. The recorded births were in excess of the deaths in only eight districts, Almora and Garhwal in the north, Hamirpur and Jhansi in the south, and Gorakhpur, Ghazipur, Ballia, and Benares in the east. In Dehra Dun the percentage of male to female births was 121·96, and in Garhwal it was 99·90; in the other districts the percentages ranged from 116·36 in Muzaffarnagar to 104·12 in Almora, the provincial mean being 109·11.

The number of deaths registered was 2,514,761 and the death rate reached the figure, unprecedented in these provinces, of 52·73, or 9·27 per thousand higher than in 1907, and 12·43 in excess of the quinquennial mean. Cholera and small-pox were unusually prevalent, but 78 per cent. of the deaths were registered under the heading "fever," to which was due the death of one person in every 24 of the population. The death rates were over 70 per thousand in six of the districts, namely, Budaun 78·02 (fever death rate 68·63), Muttra 76·98 (70·31), Bareilly 76·85 (67·31), Hardoi 73·52 (59·31), Farrukhabad 71·45 (60·32), and Morad-

* Revised figures.

abad 70·01 (59·16). In only two districts, Dehra Dun 30·66, and Ballia 27·71, were the rates less than 31 per thousand. In rural areas the mean mortality was 53·0 per thousand against an urban mean of 49·20. In some of the towns extraordinarily high rates were recorded, *e.g.*, Kairana 114·53 (cholera 7·35 and fever 104·69), Shikohabad 93·26 (fever 90·85), Atrauli 88·28 (fever 68·17), and Hathras 79·97 (plague 15·81 and fever 49·88). February and July were the healthiest months; in September the death rate was high and in October, November and December it was twice or more than twice as high as usual.

The Hindu death rate, 53·48, was considerably higher than the Muhammadan, 49·84; the death rates among the small populations of "other classes" and Christians were 11·32 and 10·46 per thousand, respectively.

Calculated upon the numbers born during the year, the death rates of male and female infants reached the high figure of 336·5 and 354·6. Boys and girls between the ages of one year and five years died at the very high rates of 115·96 and 117·78 per thousand of the census populations at those ages, respectively. Males and females over 60 years of age died at the rates of 130·22 and 117·13 per thousand. At all age periods, save 15-20 and 20-30, the death rates of males were the higher, but the general mean death rates of the sexes were 51·79 among males and 53·73 among females, an unusual relation due to the exceptional mortality among female infants and young girls.

Punjab.

In the first three months of the year the rainfall was in defect; April was unusually wet, but May was drier and June hotter than usual. The monsoon was not established until the first week in July, but the rainfall in July and August was greater than the average. The first week of September was marked by unprecedentedly heavy rain in the west of the province, after which there was practically no rain during the rest of the year. In every district, except Simla and Ambala, the rainfall during the third quarter was in excess of the normal, and, owing to the extraordinary volume of the falls, floods were universal. Crops were destroyed, towns were inundated, not only by the local heavy rain, but in many cases by torrents from the hills. Houses collapsed and many parts of the country were covered for weeks by sheets of water which maintained the atmospheric humidity above the average until December. These calamities aggravated the existing scarcity and caused almost the highest death rate the Punjab has ever known.

The number of births registered was 840,061; the birth rate was 41·8 per thousand which is 1 per thousand more than in 1907, but 0·8 per thousand less than the quinquennial mean. In the district of Lyallpur the recorded birth rate was 74·3 per thousand, but this rate is calculated from the census population which has been greatly augmented. The birth rate of Lyallpur, calculated on the estimated population, was, however, 59·3, which is considerably higher than any other district rate, the next highest being 50·5 in Shahpur and 48·2 in Multan. The lowest rates were 34·2 in Ambala, 32·2 in Kangra and 19·7 in Simla. The mean birth rate in the 43 large municipal towns was 40·7, which is 1·0 per thousand more than the five years' mean.

The deaths numbered 1,020,125, or 228,604 fewer than in 1907, when there were 608,685 deaths from plague. The death rate of 1908 was 50·73 (including 1·53 from plague) per thousand compared with 62·1 in 1907, and 48·9, the mean of the previous five years. In all districts except seven, namely,

Gurdaspur, Attock and Mianwali, Lyallpur, Multan, Muzaffargarh and Dera Ghazi Khan in the Multan Division, the numbers of deaths exceeded the numbers of births. Cholera was more prevalent than usual and so were small-pox and diseases of the bowels and respiratory organs, but the great cause of death was "fever," from which the recorded death rate was 34·66, compared with a mean of 20·60 in the previous five years.

The highest district death rates were 84·1 recorded in Gurgaon (where the fever death rate was 50·7 per thousand), 72·5 in Delhi and 63·8 in Amritsar; the lowest rates were 37·0 in Muzaffargarh, 31·8 in Dera Ghazi Khan and 25·1 in Simla.

In rural areas the mean rate was 59·19 compared with 55·58 in the towns, in four of which death rates in excess of 100 per thousand were recorded, namely, Palwal, 121·43, and Hodal, 107·10, in Gurgaon; Fazilka, 107·23, in Ferozepore, and Bhera, 102·09, in Shahpur, all comparatively small towns in which the inhabitants were exposed to great hardships on account of floods.

Hindus and Muhammadans died at the rates of 50·44 and 50·91, respectively, and Christians at the rate of 58·07. Death rates were fairly normal until August, and, owing to the decline in plague mortality, lower in the first part of the year than has recently been the case; but they began to rise in September and remained high until the end of the year, the October death rate being much the highest.

When all were attacked by fever, children and the aged, as was to be expected, suffered a heavy mortality. Calculated on the numbers born, infants died at the rate of 305 per thousand among males and 322 among females, and boys and girls between one year and five years of age died at the rates of 111·33 and 121·99 per thousand of the census population at those ages. Males over 60 died at the rate of 110·94 and females at the rate of 118·67 per thousand of the census populations. As usual in the Punjab, females died at a higher rate than males at all age periods, the general rate being 47·9 among males and 54·0 among females.

North-West Frontier Province.

The number of births recorded in 1908 was 71,181, equal to a birth rate of 37·3, which is 4·8 and 1·5 per thousand higher than the rate recorded in 1907 and the five years' mean, respectively. In the districts the rates varied between 40·8 in Bannu and 35·1 in Peshawar. The registered percentage of male to female births ranged from 136·6 in Peshawar to 111·6 in Bannu, the provincial mean being 123·6.

The autumn rainfall was excessive in Peshawar and Kohat, and there was a severe epidemic of malaria in the autumn, but it began later and ended earlier than the epidemic in the Punjab, and its effects were much less deadly.

The number of deaths from all causes registered was 68,361, and the death rate was 35·8 per thousand, compared with 35·1 in 1907 and 31·5, the quinquennial mean, the district rates varying between 37·7 in Hazara and 31·6 in Dera Ismail Khan. In rural areas the mean death rate was 35·85, compared with 35·59 in the towns, among which the highest death rates were 65·39 in

Nowashahr, where some form of fever was particularly fatal, 46·52 in Buffa, where there was an outbreak of cholera, and 40·88 in Peshawar.

Mortality in the province was comparatively low in the spring and summer months of the year except May, when there were 775 deaths from cholera, which continued to affect the rates until November. In October and November the fever mortality was high, particularly in Peshawar. Muhammadans died at the rate of 36·9 and Hindus at the rate of 24·7 per thousand.

Calculated on the recorded births the infantile death rates were 220·0 and 218·3 per thousand among males and females, respectively. Boys and girls between one year and five years of age died at the rates of 55·6 and 54·2 per thousand of the census populations at these ages. At all other age periods the death rates of females were higher than the death rates of males, the mean death rates being 35·2 among males and 36·5 among females.

Central Provinces.

The winter rains were in defect, but the monsoon broke about the middle of June and gave good rain to every district. In July and August the rainfall was heavy and continuous and the rains did not cease until near the end of September. There was no rain in the last quarter. The price of food grains was high, but the year generally was a healthy one.

The births numbered 633,575 and the birth rate was 52·84 per thousand, compared with 52·46 in 1907, and 51·26 the quinquennial mean. The birth rate was above the provincial average in ten districts, and in every district the births were more numerous than the deaths. The highest district birth rates were 65·41 per thousand in Damoh, 62·69 in Saugor, and 59·89 in Yeotmal, and the lowest was 46·08 in Balaghat.

In rural areas the mean birth rate was 54·21 compared with 40·93 in the towns. The mean percentage of male to female births was 104·03, the only wide departure from the mean being 112·92 in Burhanpur.

The deaths recorded numbered 457,081 and the death rate was 38·12 per thousand, compared with 41·70 in 1907, and 37·91, the mean of the previous five years. In the districts the rates ranged from 42·40 per thousand in Bilaspur to 22·42 in Bhandara. The rural death rate was 38·16 compared with 37·74 in the towns. Muhammadans died at the rate of 36·84 and Hindus at the rate of 32·67 per thousand, while "other classes," of which the population numbers nearly a million and a half, died at the rate of 76·0. It is probable that the death rate of Hindus is reduced and that of "other classes" increased by the deaths of members of castes included in the census population as *Hindus being* registered among "other classes".

The death rate among male infants was 279·88 and among female infants 252·11 per thousand born during the year.

Madras.

The number of births registered during 1908 was 1,192,136, and the birth rate was 32·4 per thousand, which is the highest yet recorded, and is 1·6 and 1·3 higher than the rate registered in 1907 and the five years' mean, respectively. In 18 districts the rates were higher than in 1907, and they were lower in five including Guntur,

where, for some reason which the provincial Sanitary Commissioner failed to discover, the birth rate fell from 37·3 in 1907 to 21·6 in 1908. He attributes this and other variations in the birth rate to variations in the quality of registration. In the districts the birth rates ranged from 39·3 per thousand in the urban district of Madras, and 37·4 in Chingleput to 21·6 in Guntur. In urban areas the mean birth rate was 33·6, or 1·3 per thousand higher than the mean in rural areas. The mean percentage of male to female births was 104·9. In the towns the mean percentage was 106·8, or 2·2 per thousand higher than in rural areas.

The deaths registered in 1908, owing to the unusual prevalence of cholera, outnumbered the total of 1907 by 77,903, and the death rate was 26·2 per thousand, compared with 24·3 in 1907 and 23·6 the quinquennial mean.

The highest district rate was 44·1 per thousand in Madras town, and the lowest 15·6 (compared with 20·4 in 1907) in Guntur. In the other districts the rates ranged from 39·0 in Malabar to 19·3 in Madura. In rural areas the mean death rate was 25·3, compared with a mean of 32·3 in the towns, among which exceptionally high rates were registered in Calicut (70·8), where the death rate from cholera was 29·7 per thousand; in Badagara (66·3), another Malabar town, in which the cholera death rate reached the enormous figure of 49·5 per thousand; and in Razam (63·0), a small town in Vizagapatam, in which cholera caused 153 deaths, equal to a death rate of 30·0 per thousand.

Muhammadans died at the rate of 31·7 per thousand and Hindus at the rate of 25·9, while Native Christians and "other classes" died at the rates of 22·1 and 17·5, respectively.

The death rate of male infants was 193·8, and of female infants 173·1 per thousand born during the year, respectively. Boys and girls between one year and five years of age died at the rates of 34·0 and 32·3 per thousand of the census populations at these ages. At all age periods, save 15-20 and 20-30, the death rates of the males were the higher, the means for the sexes being 27·1 per thousand among males and 25·2 among females.

Coorg.

In the small province of Coorg the births numbered 4,365, and the birth rate was 24·17 compared with a five years' mean of 24·75 per thousand. In the districts the rates ranged from 37·04 in Padinalknad to 17·44 in Mercara, the mean percentage of male to female births being 101·43.

The recorded deaths totalled 6,311, equal to a death rate of 34·94, compared with a quinquennial mean of 29·74. Among the districts the highest death rate was registered in Padinalknad, 38·85, and the lowest in Mercara, 32·25.

Male and female infants died at the rates of 279·34 and 249·65 per thousand born during the year. Save in the age periods 10-15 and 20-30 the death rates of males were higher than those of females, the means for the sexes being 34·86 and 35·05 per thousand among males and females, respectively.

Bombay.

The number of births registered in the Bombay Presidency in 1908 was 660,201, or 49,668 more than in the preceding year; and the birth rate was 35·72 per thousand, the highest since 1899. The highest district birth rates were recorded in West

Khandesh (56·53), East Khandesh (51·12) and Ahmednagar (48·28), and the lowest in the Sind districts of Thar and Parkar (21·29), Upper Sind Frontier (17·70) and Hyderabad (16·72). The mean rural birth rate was 36·92 per thousand, compared with a mean of 26·32 in the towns.

During the year 1·56 per cent of the births were registered as still-born, a figure which the provincial Sanitary Commissioner thinks much understated, instancing in support of this view the great variation in the percentage in different places—9·04 in Bombay, 5·25 in Kanara, less than 1 per cent in half the districts, including ·09 in Ahmednagar.

The mean percentage of male to female births was 107·92, ranging from 139·28 in Upper Sind Frontier to 101·92 in West Khandesh.

The number of deaths registered was 501,838, the lowest number since the appearance of plague, and the death rate was 27·15 per thousand, compared with 32·82 in 1907, and 37·0 the mean of the previous five years. Excluding the urban district of Bombay, where the death rate was 39·47 per thousand, the highest death rates were recorded in Ahmedabad (38·44), Broach (36·85), and Kanara (33·95); the lowest death rates were recorded in Thar and Parkar (18·40), Hyderabad (17·49) and Upper Sind Frontier (16·39). In rural circles the mean death rate was 25·10 compared with 37·50 in the towns, among which exceptionally high rates were registered in Dharwar, 59·29 (plague 30·10), Ahmedabad 56·54 (plague 2·80, fevers 24·26, respiratory diseases 11·52) and Karachi, 56·11 (plague 24·59).

Of the different sects by far the highest death rate was registered among "other classes," 58·50 per thousand, but the details of the figures show that in some districts these deaths were erroneously classified. Hindus died at the rate of 28·67 per thousand, Muhammadans at the rate of 21·32, and Christians, Parsees and Jains at the rates of 23·39, 23·94 and 20·42, respectively.

Calculated upon the numbers born during the year, the death rate of male infants was 191·85 per thousand and of female infants 178·70. Special enquiries into the mortality among infants were made in Bombay City, where 12,797 births out of 20,166 registered were verified by nurses. It was found that 53·5 per cent of the children were born in a healthy condition; 10·9 per cent were still-born; 15·2 per cent died within thirty days of birth, mostly of "debility." The chief causes of death of infants who survived 30 days were respiratory affections, diseases of the nervous system, bowel complaints, measles and small-pox. The remedies suggested by the Health Officer to the Municipality are the provision of lying-in-hospitals, the education and licensing of midwives, and the establishment of municipal milk depots where pure milk would be sold at a low price.

Boys and girls between the ages of one year and five years died at the rates of 49·01 and 46·53 per thousand of the census populations at these ages, respectively. In the age periods 5-10, 10-15, 15-20, and 20-30 the death rates of females were higher than those of males, but at the more advanced age periods males died at higher rates than females. The general death rate of males was 27·56 and of females 26·83 per thousand.

Lower Burma.

The number of births registered in 1908 was 189,667, and the birth rate was 34·06 per thousand compared with 32·65 in the previous year and 33·12 the quinquennial mean. In the districts the rates ranged from 42·63 in Thayetmyo to 27·17 in Bassein. The mean rural birth rate was 35·20 compared with 26·28 in the towns. The percentages of male to female births varied between 115 in Akyab and 101 in Kyaukpyu, Tharrawaddy and Tavoy, the provincial mean being 107.

The recorded deaths numbered 156,259, and the death rate was 28·06 per thousand, 1·22 per thousand higher than that of the previous year and 3 per thousand higher than the quinquennial mean, the excess being due to cholera, bowel complaints and plague. Among the districts the highest rates were registered in Rangoon, an urban district, (41·59), Prome (34·29) and Tharrawaddy (33·45), and the lowest in Maubin (20·71) and Akyab (20·69). In rural circles the mean death rate was 25·94, compared with 42·56 in the towns, among which death rates over 70 per thousand were registered in Zigon (75·90), Prome (72·77) and Toungoo (71·23), a large proportion in each case being due to plague.

The highest death rate occurred among "other classes", but there were evidently errors in classification. Hindus died at the rate of 30·99 per thousand. Buddhists at the rate of 27·95, Muhammadans at the rate of 23·13, and Christians at the rate of 21·85.

Male infants died at the rate of 222·8 and female infants at the rate of 178·9 per thousand born during the year. Boys and girls between the ages of one year and five years died at the rates of 32·84 and 29·23 per thousand of the census populations at those ages, respectively. At all age periods the male death rates were the higher, the mean death rates of the sexes being 29·54 among males and 26·39 among females.

Upper Burma.

In Upper Burma the number of births recorded rose from 96,699 in 1907 to 105,960 in 1908, and the birth rate from 33·14 per thousand to 36·32. In the districts the rates ranged from 45·72 in Shwebo to 28·21 in Sagaing. In rural circles the mean birth rate was 36·75 compared with 32·91 in the towns, among which the highest rate, 61·31, was registered in the little town of Yenangyaung in the neighbourhood of the oil fields, and the lowest rate, 13·88, at Maymyo, the hill station, in which the proportion of females is small. The percentage of male to female births was 106.

The number of deaths recorded was 83,200, and the death rate was 28·52 per thousand compared with 26·13 in 1907 and 23·09 the mean of the previous five years. The district death rates ranged from 43·26 per thousand in Kyaukse to 18·76 in Sagaing. In rural circles the mean death rate was 27·21, and in the towns, in some of which cholera or plague was severe, the mean was 38·80. Muhammadans, Hindus and Buddhists died at the rates of 32·05, 31·02 and 28·44 per thousand, respectively, "other classes" and Christians at the rates of 43·81 and 19·40.

Male infants died at the rate of 237·83 and females at the rate of 205·53 per thousand born during the year; and boys and girls between the ages of one

year and five years at the rates of 35·30 and 33·70 per thousand of the census populations at these ages.

At all age periods, except 20-30 and 30-40, the death rates of males were the higher, the general death rate of males being 30·26 per thousand and of females 26·95.

Ajmer-Merwara.

In Ajmer-Merwara the number of births registered was 20,261, and the birth rate was 42·48 per thousand compared with 31·20 in 1907 and a quinquennial mean of 32·09. In Merwara the birth rate was 54·13 and in Ajmer 39·02, the percentages of male and female births being 113·05 and 115·35, respectively.

The deaths recorded totalled 19,993, and the death rate was 40·03 per thousand, compared with 29·63 in the previous year and a mean of 30·49 in the previous five years, the increase in the death rate being mainly due to the great prevalence of fever. In Ajmer the death rate was 41·15 and in Merwara 36·26, the rural death rate being 35·34 compared with a mean of 52·60 in the towns, among which by far the highest death rate was registered in Ajmer suburb, where small-pox was epidemic, fever was exceedingly prevalent and dysentery and diarrhœa caused an exceptionally high death rate (12·96).

Male infants died at the rate of 260·28 and female infants at the rate of 267·22 per thousand born during the year; and boys and girls between the ages of one year and five years at the exceptional rates of 166·53 and 169·80 per thousand of the census populations at those ages, respectively. In the age period 5-10 and from the age of 40 onwards the male death rates were the higher, but owing to the great excess of female mortality at the earlier ages the general death rate of females (41·50) was considerably higher than that of males (38·72).

History of the Chief Diseases.

(For Statistical Tables, *see* pages 171 to 177.)

The accompanying table shows at a glance the number of deaths, and the death rates per thousand of population, recorded in British territory in India during each of the five years from 1904 to 1908. On comparing the figures for the year under review with those for the previous year it will be seen that in 1908 there was a considerable increase in the number of deaths attributed to cholera and small-pox, a small increase in the number under dysentery and diarrhœa, and an increase of nearly one million in the number attributed to fevers. Fortunately the number of deaths from plague decreased very greatly, but from all causes taken together there were recorded in British territory 253,384 more deaths than in 1907. As a result of the great decline in plague the deaths until the end of May were less by more than half a million than during the corresponding period of the previous year, but in June the increase of cholera and small-pox more than counterbalanced this advantage and after a temporary decline of mortality during August the terrible epidemic of malaria in the United Provinces and the Punjab caused the mortality for the last quarter of the year to exceed that for the last quarter of 1907 by nearly 700,000.

Years.	Cholera.	Small-pox.	Fevers.	Dysentery and Diarrhœa.	Plague.	All causes.
1904	192,835	55,232	4,093,981	240,655	940,609	7,436,472
	·85	·24	18·09	1·06	4·16	32·86
1905	441,786	70,962	4,417,655	264,124	940,821	8,117,771
	1·96	·31	19·57	1·17	4·17	35·96
1906	690,519	109,583	4,452,842	298,117	300,355	7,852,330
	3·05	·48	19·69	1·32	1·33	34·73
1907	408,102	103,988	4,464,881	282,191	1,366,223	8,399,623
	1·81	·46	19·76	1·25	5·16	37·18
1908	591,725	170,694	5,424,372	285,921	113,888	8,653,007
	2·61	·75	23·96	1·26	·50	38·22

Cholera in India in 1908.

The number of deaths from cholera recorded in British territory during 1908 was 591,725, equal to a death rate of 2·61 per thousand of the total population under registration. The rate has been exceeded only five times during the last 32 years. If the deaths recorded in the native states from which returns were received are added (Table XXV), the total amounts to 600,578. In the previous year 408,102 deaths from cholera were recorded in British territory, giving a ratio of 1·81 per thousand of population. The widespread nature of the epidemic is indicated by the fact that the Bombay Presidency, Eastern Bengal and Assam and Coorg were the only provinces in which there was a decrease in cholera mortality during 1908. The greatest numbers of deaths and the highest death rates from the disease were recorded in Bengal, the Madras Presidency, the United Provinces of Agra and Oudh and Eastern Bengal and Assam.

As in 1907 cholera was prevalent throughout the year in all provinces except the Punjab, the North-West Frontier Province, Ajmer-Merwara and Coorg, but as usual, the seasonal prevalence of the disease did not correspond in the different provinces: in Lower Burma and Eastern Bengal and Assam the greatest number of deaths occurred in April, in Upper Burma in July, in Bengal in June, in the United Provinces in September, in the Punjab, the Central Provinces and Madras in August, in the North-West Frontier Province in May, and in Bombay in July; and fewest deaths occurred in December in Lower Burma, Bengal and the North-West Frontier Province, in January in Upper Burma and the Central Provinces and Berar, in October in Eastern Bengal and Assam and Bombay, in March in the Punjab, in February in Coorg, and in November in Madras.

Some remarks upon recent investigations in connection with cholera will be found on pages 145 to 147 of this report.

Cholera in Bengal.

In Bengal in 1908 the total number of deaths recorded as due to cholera was 268,908—which with the exception of the number in 1900 was the highest ever recorded—or 5·32 per thousand of population, as compared with 205,702 or 4·07 per thousand in 1907, and 157,413 or 3·11 per thousand, the average for the five years 1903—1907. Every district in the province was affected, and 523 out of 529 registering circles against 500 in the preceding year. The highest mortality was recorded in the Balasore district of the Orissa division where 28,070 persons, or 26·20 per thousand of the population, died from this cause; next in order came Puri with 14,666 (14·41), Palamau with 7,228 (11·66), Gaya with 22,216 (10·78) and Birbhum with 9,183 (10·17). Ranchi which was the least affected of all the districts last year now occupies the ninth place. In only one district, Darjeeling, was the rate (·38) below 1 per thousand. The disinfection of wells with permanganate of potash was carried on in about 19 districts where cholera prevailed.

The months of greatest prevalence were June, May and April and the months of least prevalence December and November.

The towns in which the highest death rates from cholera were recorded were Dumka in the Santhal Parganas district (36·42), Asansol in Burdwan (23·88), Tikari in Gaya (16·46), Samastipur in Darbhanga (15·05), Dainhat in Burdwan (12·99), Suri in Birbhum (12·77), Garulia in 24-Parganas (12·16), and Nadia (11·21). In rural areas the highest death rate (52·35 per thousand) was recorded in Soro (Balasore).

Among the European seamen of the port of Calcutta there were four deaths from cholera, and there were 131 among the native floating population.

Cholera in Eastern Bengal and Assam.

The number of deaths attributed to cholera in Eastern Bengal and Assam during 1908 was 59,329, equal to a ratio of 1·99 per thousand of the census population, as compared with 77,181 deaths or a ratio of 2·58 in 1907. April and May were the months of greatest prevalence and the fewest number of deaths occurred in October. The highest death rates were recorded in the districts of Darrang (9·05), Sibsagar (8·85), Nowgong (6·52), and Cachar in the Surma Valley (5·23); and among the Eastern Bengal districts Bakarganj recorded the highest ratio (3·58). The provincial Sanitary Commissioner reports that the outbreak in the two first named districts was due to the repeated importation of new sources of infection

both by steamer and railway between the months of January and June. The District Board of Rungpur have introduced the practice of keeping phials of permanganate of potash at every *thana*, for free distribution, to disinfect the water in case of an outbreak of cholera, and the salt is reported to be in great demand.

In towns the highest death rates were recorded in Tezpur (23·18) and Golaghat (13·14), and in rural areas in the Gohpur Circle of Darrang (31·98) and in the Sonari circle of Sibsagar (22·19).

The death rate from cholera among the tea garden population in Assam was 5·34 per thousand. It is said that during the first half of the year an unusually large number of labourers were imported into the tea districts from areas where scarcity prevailed and that since many of these labourers suffered from cholera the infection was spread broadcast.

Cholera in the United Provinces.

The total number of deaths from cholera recorded in the United Provinces was 83,544, equal to a ratio of 1·75 per thousand of population, as compared with 22,438 and a ratio of ·47 in 1907. The average death rate of the preceding quinquennium was 1·46. The greatest number of deaths occurred in September and the smallest number in February. All districts were affected, but in Jhansi, Dehra Dun, and Etawah the numbers of deaths returned were only 7, 21 and 37, respectively. The districts with the highest death rates were Kheri (7·54), Garhwal (6·80), Pilibhit (5·96), Mirzapur (5·30), Shahjahanpur (4·66), Bahraich (4·62) and Bareilly (4·16). The highest death rates from this disease recorded in towns were 12·45 in Nanpara (Bahraich), 11·24 in Basti, 8·60 in Ghaziabad, 8·02 in Bahraich and 7·35 in Kairana. Of the 105 towns with a population of 10,000 or more, no death from cholera was reported in 21, while in 32 of the remainder the number did not exceed ten. Both the urban and rural mortality were considerably higher than in the previous year, the rates being 1·27 and 1·79 against ·41 and ·47, respectively.

Cholera in the Punjab.

95. In the Punjab the total number of deaths recorded as due to cholera was 12,297 (0·61 per thousand of the population) against 437 (·02) in the previous year and 0·22 the mean of the quinquennial period ending with 1907. With the exception of the district of Simla, where only one imported fatal case occurred, every district in the province was affected, and deaths were recorded in 76 towns and 1,085 villages. No deaths were reported to have occurred during January, February and December, and only one was reported in March. August was the month of maximum prevalence when 2,520 deaths were registered. The largest number of deaths occurred in the Lahore district (1,556), Gurgaon coming next (1,251), and the lowest in Simla (one death only), and Montgomery (32 deaths). The highest death rates were registered in Jhelum (2·21 per thousand of the population), Rawalpindi (1·94), Mianwali (1·78), and Gurgaon (1·68) and the lowest ·03 in Simla, 0·07 in Montgomery and 0·14 in Muzaffargarh. Of the 143 municipal towns in the province, those in which the highest death rates were recorded were Lieah (19·48 per thousand of population), Kasur (12·03), Fazilka (8·70), Narowal (8·59), Rewari (8·46) and Rupar (8·33).

Cholera in the North-West Frontier Province.

In 1907 there were 266 deaths from cholera recorded in the North-West Frontier Province, but in 1908 the number rose to 2,845, the highest since 1901. The first case

was reported in April in Peshawar city, the patient being a man from Hurdwar, who had been attending on a friend suffering from the disease; shortly afterwards several more cases occurred and the whole district was soon affected. Bannu was the next district attacked and in this district, except in one or two villages where waterborne epidemics were reported, the disease continued in sporadic form from May till November. In May, owing to importation from outside, the districts of Hazara, Kohat and Dera Ismail Khan were affected.

Cholera in the Central Provinces and Berar.

In the Central Provinces and Berar the total number of deaths recorded as due to cholera was 9,048 or ·76 per thousand of the population, as compared with 4,291 or ·36 per thousand in 1907. Of the total number in the year under review, 8,790 deaths (equal to a ratio of ·95 per thousand of the population) were recorded in the Central Provinces, and 258 (·09 per thousand of the population) in Berar. Of the 20 districts in the Central Provinces, four only, *viz.*—Saugor, Damoh, Burhanpur and Betul, were free from the disease; of the sixteen affected districts, Raipur with 1,899 deaths, Bilaspur with 1,712, Drug with 1,450 and Nagpur with 1,212 suffered most. In Berar all four districts were affected. In the province as a whole the months of greatest prevalence were August, September and October, and those of least prevalence January (in which only nine deaths were reported), February and March. The provincial Sanitary Commissioner considered that in many instances the spread of infection was favoured by the gathering together of large parties at fairs and during the marriage season and the harvest.

Cholera in the Madras Presidency.

In the Madras Presidency in 1908 there were 141,970 deaths recorded as due to cholera, giving a ratio of 3·9 per thousand of the population, as compared with a total of 81,565 and a ratio of 2·2 per thousand in 1907. All the districts in the Presidency were affected and the disease was present throughout the year in 18 of the 23 districts. The highest death rates recorded in districts were 9·9 in Malabar, 8·5 in Anantapur, 7·4 in Kurnool, 5·7 in Ganjam, 5·1 in Cuddapah, 4·3 in Tinnevelly and 4·0 each in Kistna and South Arcot. In the Nilgiris district only 25 deaths were recorded, the Madras district coming next with 1,172 deaths. The months of greatest prevalence were August and July in which no fewer than 25,685 and 19,956 deaths, respectively, occurred, and the lowest numbers of deaths (6,079 and 7,036) were recorded in November and October.

The highest death rates from cholera recorded in towns were 29·7 in Calicut, 23·7 in Tellicherry, 18·5 in Nandyal and 16·4 in Cannanore; while Kodaikanal, Coonoor and Ootacamund were practically free from the disease. Out of 43,133 towns and villages in the Presidency, deaths from cholera were reported from 11,286 as against 6,430 in 1907.

Favourable reports were received in regard to the use of permanganate of potash for the purification of contaminated sources of water-supply.

Cholera in the Bombay Presidency.

In the Bombay Presidency there were recorded as due to cholera 1,759 deaths, equal to a ratio of ·09 per thousand of the population, as compared with 7,656 deaths or a ratio of ·41 per thousand in 1907. During the last twenty years the mortality from this disease has never been lower. Of the 26 districts, twelve were entirely

free from the disease, and seven others were only slightly affected. The highest death rates were recorded in the districts of Kanara (1·10 per thousand of population) and Karachi (1·09). More than half the deaths occurred during June, July and August.

Cholera in Burma.

In Lower Burma during 1908 there were recorded as due to cholera 9,336 deaths, equal to a ratio of 1·68 per thousand of population, as compared with 7,964 deaths or 1·43 per thousand from the same cause in 1907. Deaths from cholera were recorded during each month of the year, the highest number occurring in April and the lowest number in December. The districts with the highest death rates were Kyaukpyu (5·83), Toungoo (3·93), Sandoway (3·17), Tharrawaddy (3·10) and Myaungmya (3·02); in towns the highest death rates were 16·08 in Zigon, 15·60 in Toungoo, 13·86 in Myanaung, 12·88 in Paungde and 12·83 in Pyapon.

In Upper Burma the total number of deaths recorded as due to cholera during 1908 was 2,575, equal to a ratio of ·88 per thousand of population, as compared with 414 or ·14 per thousand from the same cause in 1907. Two out of the 11 districts were entirely free from the disease and in one (Mandalay) there were only 47 deaths. Deaths from cholera were reported during each month of the year; the highest number occurred in July and the lowest number in January. In districts the highest death rates per thousand of population recorded were 3·19 (786 deaths) in Magwe, 2·98 (721 deaths) in Yamethin, and 2·64 (515 deaths) in Minbu; in towns the highest death rates were 28·11 in Taungdwingyi, 9·73 in Pyinmana, 7·96 in Minbu and 6·80 in Meiktila.

The prevalence of the disease in all cases was attributed to the contamination and pollution of the sources of the water-supply.

Cholera in Ajmer-Merwara.

No death from cholera was recorded in Ajmer-Merwara during 1908, as compared with one death in 1907 and 284 deaths in 1906. During the years 1903 to 1905 no deaths from this disease were recorded.

Cholera in Coorg.

In Coorg 114 deaths from cholera were recorded during 1908, giving a ratio of ·63 per thousand of population, as compared with a total of 187 deaths and a ratio of 1·04 per thousand in 1907. This small province had been entirely free from the disease in the four years prior to 1906.

Small-pox.

From the marginal statement in the first paragraph of this section it will be seen that in British territory in India the death rate per thousand of population from small-pox rose from ·46 in 1907 to ·75 in 1908. The mean ratio for the quinquennial period from 1903 to 1907 was 0·37. The total number of deaths recorded from this disease during 1908 was 170,694 against 103,988 in 1907 and 109,583 in 1906. The death rates during 1908 were higher than in 1907 in all provinces except Lower and Upper Burma, the North-West Frontier Province and Coorg, the increase being greatest in the Punjab, the United Provinces of Agra and Oudh, Ajmer-Merwara, and the Central Provinces and Berar, while in the Madras Presidency the rate remained unchanged. The small-pox mortality recorded in towns (0·76) was almost the same as that in the rural areas (0·75); and the

deaths of children under ten years of age amounted to 70·61 per cent of the total number of deaths from this cause.

In Bengal the number of deaths from small-pox rose from 29,665 (·57 per thousand) to 35,966 (·71 per thousand) in 1908; the mean death rate during the quinquennial period ending with 1907 was ·37 per thousand. Among the districts with the highest mortality, Gaya stood first with a death rate of 3·24 per thousand of population, followed by Patna with a ratio of 3·11, while Puri which stood first last year (with a ratio of 2·95) now occupies third place with a ratio of 1·45 only. The provincial Sanitary Commissioner states that the smaller mortality in Puri is evidently the result of the special measures adopted for pushing vaccination there. The districts of Purnea, Nadia, Jessore, Khulna and Darjeeling remained practically free, the death rates in them being below ·1 per thousand. In towns 2,903 deaths and in rural areas 33,063 deaths from small-pox were registered as compared with 3,366 and 25,700, respectively during the previous year. Among children under one year and from one to ten years of age the mortality was higher than in 1907.

In Eastern Bengal and Assam during 1908, small-pox caused 9,373 deaths, equal to a death rate per thousand of ·31 against 8,693 deaths and a ratio of ·29 in 1907. The highest rates per thousand of population in districts were reported from Darrang (3·89), Kamrup (2·87) and Nowgong (2·04) in the Assam Valley. In the remaining 19 districts the rate recorded was lower than 1·0 per thousand of population. In towns the highest death rate (2·96) was recorded in Golaghat, and for the first time on record, in the town of Barpeta, which is said to be the focus of small-pox in the Assam Valley, the mortality fell to ·09. This is said to have been due to the vaccination of nearly all the susceptible children. In Cachar, the best vaccinated district in the province, only 4 deaths were reported.

In the United Provinces in 1908, there were 59,996 deaths from small-pox against 22,645 in 1907 and 13,202 in 1906, the corresponding rates being 1·26, ·47 and ·28 per thousand of population, respectively. The average rate for the quinquennial period was ·29. The highest number of deaths occurred in May and the lowest in October. The highest death rate in districts was again recorded in Partabgarh (5·79), followed by Sultanpur with 5·32, Gonda (3·88), Hardoi (2·86) and Moradabad (2·78). Two districts, Jhansi and Jalaun, were practically free from the disease, and in Garhwal and Dehra Dun the number of deaths did not exceed ten. No death from small-pox was recorded in 27 of the 105 towns with a population of 10,000 and upwards, while in 34 the number did not exceed ten.

In the Punjab 28,652 deaths from small-pox, equal to a ratio of 1·42 per thousand, were registered during the year, as compared with 11,082 deaths and a ratio of ·55 in 1907, and 0·54 the mean ratio during the preceding quinquennium. The highest rates in districts were 5·04 in Lyallpur, 3·24 in Lahore, 2·58 in Ferozepore, 2·52 in Sialkot and 2·12 in Montgomery. The highest mortality was registered in June (5,227 deaths), May coming next with 5,057 and the lowest was in December, when only 399 deaths occurred. The death rates in the four largest towns were 3·00 in Lahore, 2·84 in Multan, 2·60 in Amritsar, and 0·37 in Delhi. The death rate in towns in which vaccination is compulsory was 1·71 compared with 2·44 in those in which it is optional.

In the North-West Frontier Province the number of deaths recorded as due to small-pox fell from 769 (·40 per thousand) in 1907, to 734 (·38 per thousand). By far the largest number of deaths (586) occurred in the Peshawar district, in which, as also in the Hazara district, the disease prevailed during every month of the year. The Bannu district was practically free from the disease (2 deaths only), while the Kohat and Dera Ismail Khan districts were affected to a very slight extent (13 and 29 deaths, respectively). The months of greatest prevalence in the province as a whole were January and February.

In the Central Provinces and Berar there were 9,044 deaths from small-pox, equal to a ratio of ·75 per thousand of population, as compared with 3,826 deaths and a ratio of ·32 in 1907. April and May were the months in which the disease was most prevalent. Of the total number of deaths, 6,663 occurred among children under ten years of age. The largest numbers of deaths were reported in the Raipur (2,506), Bilaspur (2,377) and Drug (1,221) districts, all of which are in the Mahanadi division.

In Burma there was a considerable decrease in the mortality from small-pox during the year, the total number of deaths being 1,298 against 2,882 in 1907, and 8,540 in 1906. The highest mortality occurred in April and May and the lowest in November. The highest death rates were recorded in the Kyaukpyu and Pyapon districts in Lower Burma and the Pakokku and Myingyan districts in Upper Burma. During the year, two important Vaccination Acts were introduced by the local Government. The first has for its object the prohibition of inoculation in rural areas and the second is for the improvement of the facilities for enforcing compulsory vaccination among the occupants of lodging houses and among immigrant coolies in Rangoon.

In the Madras Presidency small-pox accounted for 22,204 deaths (·6 per thousand of population) against 22,455 (·6 per thousand) in 1907. All the 23 districts were more or less affected, the highest death rates recorded per thousand being in Vizagapatam (1·8), South Arcot (1·6), North Arcot (1·4) and Malabar (1·3); in the other districts the rate was below 1 per thousand. Of the 61 municipal towns, 18 were free from the disease and in the remaining 43 a total of 928 deaths was registered. The highest rates recorded were 6·8 in Palghat, 3·2 in Ellore, 2·3 in Rajahmundry and 2·2 each in Guntur and Tiruvannamalai. The death rate in towns was ·3 and in rural areas ·6. The months of greatest prevalence were March and April.

In the Bombay Presidency the number of deaths from small-pox recorded during 1908 was 2,526 (·14 per thousand) against 1,862 (·10 per thousand of population) in 1907. Three only out of the 26 districts were entirely free from the disease. Deaths were reported from 145 of the 289 registration circles in the Presidency, but the incidence of the disease was heaviest in Bombay City, the Western, Central and Southern Registration districts, and in two Collectorates of Sind, while Gujarat and the greater part of Sind remained practically free. The months of greatest prevalence were, as usual, March and April. Of the total number of deaths, 666 occurred among children under one year of age.

In Ajmer-Merwara 863 deaths (1·81 per thousand) from small-pox were recorded during 1908 as compared with 497 (1·04 per thousand) in 1907.

In Coorg the number of deaths reported as due to this disease was 38 against 211 in the previous year.

Plague.

The absence of the usual winter rise in plague mortality during 1907 enabled the prediction to be made that a great decline in the prevalence of the disease would occur in 1908. This prediction has been abundantly fulfilled, for the number of deaths recorded throughout the country fell from 1,315,707 to 156,480, the smallest total since 1900.

In the British Provinces the number of plague deaths registered was 113,888, which is less than half the number recorded under respiratory diseases and less by about 172,000 than the number recorded as due to dysentery and diarrhœa. The course of the epidemic differed from that of the last four years in that the maximum prevalence was attained in March instead of in April. The decline from April to July, when fewest deaths were recorded (only 1,630), was very rapid and the autumnal rise slight. As in 1905 and 1907 the disease, instead of increasing greatly in prevalence during November and December, remained at a low level, which indicated that the year 1909 would again experience only a comparatively mild epidemic. In the Native States the number of deaths aggregated 42,592, which is considerably less than one-third the mortality recorded in 1907, the decrease being especially marked in the monthly totals from February to May.

The mean death rate from plague in the British Provinces was ·50 per thousand compared with 5·16 in 1907, the decrease being common to all provinces except Madras, in which the rise was very slight, and the small areas of Ajmer-Merwara and Coorg in which the numbers of deaths were considerably below 100 in both years. It was greatest in the Punjab where the rate fell from 30·57 per thousand in 1907 to only 1·53 and in the United Provinces where the rate fell from 6·90 to ·48.

In the city of Calcutta the mortality fell from 3,591 to 1,779, in Bombay from 6,379 to 5,348 and in Madras from 3 to 2.

Recent investigations.

Among the subjects investigated since the last issue of this report one of the most important concerns the factors upon which the annual reappearance of the disease in epidemic form depends. The researches of the Plague Commission, a summary of which was given in this report for 1906, led to the conclusion that during the non-epidemic season a few cases of acute plague in rats and human beings still continue to occur in certain towns and villages of the Punjab, and that when the seasonal conditions favourable to an epizootic and epidemic again come round the prevalence of the disease rapidly increases in those centres which then become foci from which infection is conveyed in rat fleas to other places. It appears that so far as this statement goes it is agreed to be correct by all observers, but that if it is put forward as affording a complete explanation of the annual epidemic there will be a number of dissentients. That the view affords a complete explanation of the annual epidemic in the Punjab has been called in question especially by Major Browning Smith, I.M.S.,* chief plague medical officer in that province. He agrees that in a very few localities cases of acute plague

* Transactions of the Bombay Medical Congress, 1909, page 136.

continue to occur during the inter-epidemic period and that the spread of infection from those places is one factor concerned in the annual widespread epidemic, but he considers that this is a quite insufficient explanation of the yearly sudden, almost simultaneous, reappearance of the disease in a large number of localities which have been completely free for many months from any discovered sign of acute plague in either rats or man. In a number of these places no evidence that the disease has been reintroduced by importation can be obtained, and Major Smith considers therefore that its reappearance must be due to a renewed activity or "recrudescence" from causes which are as yet unknown but are inherent in a locality that has once been infected. The investigation upon the results of which his view is based related to 277 localities. Evidence of the persistence of cases of plague in animals or man throughout the inter-epidemic period was obtained in only eleven of these and evidence that the reappearance of the disease was, or might have been, due to fresh importation in 140. In the remaining 126 localities it appeared to Major Smith that the reappearance of the disease could be accounted for only on the view of recrudescence in the absence of fresh importation. Evidence of a similar nature has been brought forward by Dr. Colvin* with the object of showing that of three small outbreaks of plague in Glasgow and of two in Liverpool between 1900 and 1908 only the first in each city respectively was due to importation, the others having arisen, according to Dr. Colvin, from renewed activity of an infection which, in spite of the great efforts made to destroy it, had remained latent in an undiscovered (and presumably not easily discoverable) form since the first outbreak. The subject is of considerable importance in connexion with prophylaxis. If the yearly widespread epidemic results from the new lighting up in a large number of villages of the embers of infection remaining from a previous epidemic it is exceedingly difficult to devise measures that will promise an effective extirpation of the disease, but if in the great majority of places the annual outbreak is due to fresh importation from an insignificant number of localities which, on account of the continued occurrence of cases of plague in rats or man can be identified without difficulty, the measures by which the disease might be successfully stamped out are sufficiently obvious. The problem has been studied in detail by the Plague Commission but until the publication of their report, which is now in the hands of the Advisory Committee for plague investigation in India, it is necessary to suspend judgment upon it.

Plague in Bengal.

In 1908 the total number of deaths from plague in Bengal was 15,948. The number gives a ratio of ·31 per thousand of population, against 1·65 in 1907. Thirteen out of the 33 districts were entirely free from the disease, in two the death rate was higher, in 25 it was lower and in six it was the same as in the preceding year. The district in which the highest death rate was recorded was Calcutta (2·09), and Patna, which headed the list last year, came second, (1·25 against 13·45), followed by Monghyr (1·22), Shahabad (1·03) and Saran (·97). As regards towns, the highest rates were 21·47 per thousand in Roserah, 18·67 in Monghyr, 12·61 in Hajipur, 11·87 in Jagadispur, 8·92 in Bhagalpur and 8·12 in Jamalpur. In none of the rural areas did the disease prevail in epidemic form. The months of greatest prevalence were March (6,001 deaths) and February (3,351) and fewest deaths occurred in August (70) and September (99).

* Lancet, December 5th, 1908, page 1707.

Plague in Eastern Bengal and Assam.

In 1907 only eight cases of plague were reported to have occurred in Eastern Bengal and Assam, and in the year under review it enjoyed complete freedom from the disease.

Plague in the United Provinces.

The number of plague deaths registered in the United Provinces fell from 328,862 in 1907 to 22,878,—the lowest yet recorded—and the death rate fell from 6·90 to ·48. The month of greatest prevalence was March (7,895 deaths) and fewest deaths occurred in August (39). Females, as in previous years, suffered more than males, the death rates among the two sexes being ·55 and ·41, respectively. The highest district death rates were recorded in Muttra (3·26 per thousand), Ballia (2·34), Unao and Ghazipur (1·31 each), Mainpuri (1·10) and Cawnpore (1·07). Five (Almora, Garhwal, Sitapur, Banda and Jhansi) out of the 48 districts were entirely free from this disease. In 65 of the 105 towns with a population of and over 10,000, no death was recorded, and in 27 others the number did not exceed ten. Death rates of over 10 per thousand were recorded in Hathras (Aligarh) (15·81), Gonda (15·05), Bansodih (Ballia) (13·47) and Barhaj (Gorakhpur) (11·90). In rural areas the death rate was ·46 compared with ·70 in the towns.

Plague in the Punjab.

In the Punjab only 30,708 deaths from plague were recorded during 1908 against 608,685 in 1907, when the disease prevailed with unprecedented severity. The death rate was 1·53 per thousand of population compared with 30·27 in 1907 and 16·25 the mean of the previous five years. Five (Simla, Kangra, Multan, Muzaffargarh and Dera Ghazi Khan) out of the 29 districts were entirely free, and in 13 others the death rate was below 1 per thousand of the population. The highest district death rates were recorded in Ludhiana (7·02), Gurgaon (6·75), Ferozepore (3·41), and Lahore (3·06). In towns the highest rates were recorded in Balabgarh in Delhi (26·85), Khudian in Lahore (17·94), Maini in Hoshiarpur (13·73), and Rewari in Gurgaon (13·41). The months in which the greatest mortality occurred were April and March and fewest deaths were reported in August and July. Males suffered less than females the ratios per thousand being 1·39 and 1·69, respectively.

Plague in the North-West Frontier Province.

In this province there were only 563 deaths recorded from plague during 1908 against 1,547 in the previous year. Of the five districts, only two—Peshawar (423 deaths) and Dera Ismail Khan (140 deaths)—were affected. The largest number of deaths occurred in May (260). No death was reported during February and only two occurred in July, after which month the disease entirely disappeared.

Plague in the Central Provinces.

In 1908 there were only 6,236 deaths from plague in these provinces, of which 1,984 were in the Central Provinces and 4,252 in Berar. The total figure gives a ratio of 0·52 per thousand of population, as compared with a ratio of 3·18 per thousand (37,774 deaths) in 1907. Of the 24 districts four, *viz.*—Damoh, Nimar, Seoni and Drug, were entirely free from the disease, and in ten others the number of deaths in each did not exceed ten. The districts of Betul (death rate 1·87), Nagpur (1·40), Amraoti (2·89) and Buldana (2·28) suffered most. No deaths from plague were reported in June, only nine occurred in July and the

highest number (1,160) was registered in October. In towns the highest rates were recorded in Karajgaon (37·42), Amraoti (29·69), Dattapur (22·94), Khamgaon (22·68) and Badnera (20·35). The death rates among males and females were 0·54 and 0·50, respectively.

Plague in Madras.

In 1908 the number of deaths recorded from plague in the Madras Presidency was 3,358 against 2,872 in 1907. Eleven out of the 23 districts reported no death, and in four others the total number of deaths did not exceed ten. In the remaining eight districts, the highest death rates were recorded in the Nilgiris (1·3), Bellary (0·6) and Coimbatore (0·5). The disease was prevalent throughout the year in the districts of the Nilgiris, Salem, and South Kanara. The largest number of deaths (491) was recorded in August and the smallest (114) in June. In towns the highest mortality occurred in Cannanore (303), Mangalore (208) and Calicut (203).

Plague in Bombay.

The number of deaths from plague in the Bombay Presidency in 1908, was 27,345 (1·48 per thousand of population) against 93,609 in 1907, (5·06 per thousand), the number being the lowest on record since the present epidemic became established. The highest ratios recorded in districts were 6·40 in Karachi, 5·57 in Bombay, 5·18 in Poona and 4·35 in Belgaum. The district of Thar and Parkar was entirely free from the disease and in three others —Panch Mahals, Sukkar and the Upper Sind Frontier the number of deaths reported were 9, 3 and 2, respectively. Among towns Dharwar (30·10), Kirkee Cantonment (28·62), Karachi (24·59) and Nasirabad (14·45) suffered severely. The month of greatest prevalence was March (3,776 deaths) and fewest deaths (457) were recorded in June. Males suffered more than females, the death rates among them being 1·55 and 1·40 respectively.

Plague in Burma.

The total number of plague deaths recorded in Burma fell from 9,249 in 1907 to 6,752. Of the total, 5,169 occurred in Lower Burma and 1,582 in Upper Burma. The districts chiefly affected were Rangoon (4·17 per thousand), Amherst (2·22), Prome (2·14) in Lower Burma and Mandalay (3·45) in Upper Burma. In Lower Burma the highest mortality occurred in February (1,056 deaths) and the lowest in November (57 deaths). In Upper Burma the heaviest incidence also occurred in February and only six deaths were recorded in each of the months of May and August. Of the 19 districts in Lower Burma, the three in the Arakan Division, as usual, remained free, and no deaths were reported from Tavoy, Mergui and Thayetmyo. In Upper Burma, five out of the 11 districts were entirely free, and in a fourth five deaths only were recorded. In towns in Lower Burma the highest death rates were recorded in Thonza (23.72), Prome (23·60), Zigon (21·75) and Myanaung (16·53), and in Upper Burma in Pyinmana (12·30), Mandalay (6·54) and Yamethin (5·18). In rural areas in Lower Burma 646 deaths only were reported, equal to a death rate of ·13 compared with 6·37 in towns. In Upper Burma the rural death rate was ·05 compared with 4·38 in towns.

Plague in Coorg and in Ajmer-Merwara.

There were 26 deaths from plague reported in Coorg against two in 1907. Fourteen of the deaths occurred in the town of Virajendrapet. The mortality was equally divided amongst males and females. In Ajmer-Merwara the number of deaths attributed to plague was 74 as compared with 13 in 1907.

Fevers.

The wave of epidemic malaria which in the autumn of the year swept over certain provinces of India was the chief distinguishing feature of 1908. The total number of deaths registered under the heading "fever" is usually remarkably constant from year to year being a little short of 4½ millions and the mean death rate rather less than 19·5 per thousand, but in 1908 the number was no less than 5,424,372 and the death rate 23·96 per thousand. In many parts of India the heading includes nearly all the deaths that are registered, and in by far the greater part of the country the only diseases not recorded under it are those which, like cholera and small-pox, are unmistakeable by the people themselves. The crude figures are therefore of no value as an indication of the actual mortality from malaria but when the seasonal incidence of the chief epidemic diseases is known the figures enable an estimate to be made of the increase or decrease of malaria that has occurred in any particular year. Thus a comparison of the monthly fever mortality for 1908 and 1907 gives the following results. The figures for January 1908 exceeded those for January 1907 by about 15,000 and since the increase was confined to the United Provinces and the Punjab in which during that month cholera, small-pox, and plague were not prevalent we may assume that the increased mortality was due directly or indirectly to malaria contracted in the autumn of 1907. During February and March the fever mortality showed a considerable decline on that for the same months of 1907, but there was an increase of over 1,00,000 deaths during April, May and June. This increase was almost entirely in Bengal, Eastern Bengal and Assam, and Madras, and must be ascribed chiefly to cholera which during those months was prevalent to an unusually severe degree in those provinces. In July there was again a decline in the fever mortality as compared with the same month of the previous year but from August onwards an increase in each month, the greatest being in October and November when the fever deaths exceeded those for the same months of 1907 by 322,413 and 313,983, respectively. This great increase, which amounted during the last four months of the year to as many as 835,617, was chiefly confined to the United Provinces and the Punjab and must be ascribed almost entirely to the epidemic of malaria which raged in those parts of India. Some details of the results of the epidemic will be found in the paragraphs below, but before dealing with them the opportunity may be taken to state briefly a point of view from which the subject of the mitigation of malaria among the civil population of India may be approached.

Prevention and mitigation.

A rough idea of the extent to which death from malaria is preventible in India may be formed from a study of the effects of the disease in the Native Army and in jails, but, of course, in any comparison of the statistics referring to soldiers and prisoners with those of the general population, we must not omit to make allowance for the age and sex constitution of the populations compared, and for the peculiarly favourable conditions in which preventive measures act among bodies of men under skilled control. The Native Army consists of picked men who, when they are with their regiments, are looked after carefully in health and skilfully tended when sick. The admission and death rates ascribed to malaria have declined in recent years, but during each of the ten years ending with 1907 it may be said that three men in every 2,000 died from its effects. Prisoners are greatly inferior to soldiers in physique and they are subject to the depressing effects and monotonous routine of jail life. Moreover, there is

a continuous flow into and through the prisons of individuals, many of them infected with malaria, taken from the lowest and poorest ranks of society. Still, far more stringent measures of prevention are possible in jails than in regimental lines, and the results are consequently better, so far as malaria is concerned. In each year of the decennium, on an average, four prisoners in each 3,000 died from malarial fever. When the deaths ascribed to malaria in the jails are closely investigated, it is found that in a considerable proportion of the cases death was due to a cause other than malaria, so that the mean death rate of the ten years, which on paper is 1·30 per thousand, is in fact only about 1 per thousand. That is to say, the death rate among prisoners from malarial fevers is about one-fifth of what it is among the general population. A comparison of a death rate among prisoners with that among the general population is misleading owing to the numbers of children and old people among the latter, but preventive measures are by no means perfect in the prisons, and perhaps we may say that if we could place all the people in fairly good hygienic conditions, give them prophylactic doses of quinine during the fever season and provide them with suitable food and skilled attendance when they are attacked, we should prevent three-fourths of the deaths from fever that now occur. This is perhaps rather speculative but our experience in prisons does show this, malarial fever properly treated is by no means a fatal disease among adults. In 1908 malarial fevers were extraordinarily prevalent and fatal in north-western India. During the year there were 20,039 cases of fever admitted into the jail hospitals throughout the country, and only 105 of those cases terminated fatally. Assuming that all the 105 died from malaria, which the *post-mortem* records show was by no means the case, this means that only one in 191 cases of fever ended in death, and this in a year when the fever was peculiarly deadly. Contrast this with the state of affairs among the general population in the United Provinces in 1908, when one person in every 24 died of fever—in that year mostly malarial. Why is it that a disease which is so rarely fatal to a prisoner should be so often fatal to a free man?

A very large fraction of the total mortality from fever among the general population occurs among children and the aged, and in epidemic years they suffer disproportionately, because in such years, for reasons which we shall presently mention, they have to suffer from privations which loosen their feeble hold on life. In the Punjab in 1908 the infantile death rate from fever was doubled and the fever death rates among children between the ages of 1 year and 10 years of age were more than doubled. While due allowance must always be made for the share of the total mortality occasioned by malaria among the very young, it seems that, in normal years at any rate, there is sometimes a danger of exaggerating it, for it is not uncommon to find practically all the deaths occurring in infancy attributed to malarial fevers. Now we know that, in temperate climates, where there is no malaria, the mortality in infancy even in favourable circumstances is high; and in a tropical or sub-tropical country with a very high birth rate, we cannot expect children to escape the effects of mal-nutrition, bowel complaints, parental ignorance and other special dangers of childhood. Again in normal years many of the deaths which result from malarial fevers are directly due to the treatment, or rather want of treatment of the cases. I do not refer to the neglect of medicinal remedies, but to the withholding of food. In this country and in some others it is an article of popular superstition that a fever should be starved, and the sufferer and his friends believe that the taking of food brings on the attack of fever. Too often it is the sufferer that is starved and not the fever.

In any place in which malaria exists meteorological conditions may determine a severe epidemic of fever, when the disease becomes not only much more common, but enormously more fatal than in ordinary years. When heavy rains precede a severe outbreak of fever, they cause floods, when large tracts of country are submerged, houses collapse, harvests are destroyed and the poorer classes of the peasantry are not only thrown out of employment, but are exposed to great privation and hardship. It is then that the mortality among children and the aged is so high—malaria, owing to the simultaneous occurrence of exposure and privation, has become a very fatal disease. These are obvious considerations, but there are others which have not yet been fully elucidated. The floods, of course, produce lasting pools of water in which mosquitoes breed, but a feature of these autumn epidemics is the suddenness of their onset, which it seems can be accounted for only by large numbers of mosquitoes being very rapidly infected.

In the towns, in India as in other countries, there are numbers of people who lead a hand to mouth existence; ill-housed, ill-clad and ill-fed, they pick up a precarious livelihood in the unskilled labour market. Such people have unsuitable food at the best of times, and they have no savings, so that when anything occurs to check the demand for such work as they can do, the scanty coarse food becomes scantier and coarser and they and those dependent on them offer little resistance to malarial infection and readily succumb to its effects. Analogous conditions, as pointed out by Christophers and Bentley, may be artificially produced in any area in which anopheles mosquitoes can breed, when large numbers of labourers are collected in it under bad hygienic conditions. The majority of such labourers are free from infection, but are *highly* susceptible to it, a few are infected, and all are dependent on their daily labour for their daily bread. Infection spreads and with it the inability to earn money to pay for sufficient food, privation added to malaria determines a severe attack, attacks are repeated and here again the disease is a very fatal one.

The cause of malaria is a sporozoan parasite of which there are three species generally recognized. These parasites pass the sexual phase of their lives in certain mosquitoes and the asexual phase in the blood of man. The important fact in respect of the prevention of malaria is that in nature the parasites occur in both hosts and, so far as is known, nowhere else. Preventive measures are founded on this fact and have for their object the destruction of the insect host, the prevention of the transference of the parasites from one host to the other, or the destruction of the parasites in the blood of man. It is unnecessary to enumerate in detail the devices, which have been used to effect these objects, they may all, I think, be classified under three heads—

(1) The extermination of mosquitoes.

(2) The prevention of bites.

(3) The administration of quinine.

The prevention of bites is useful as a supplement to more radical measures but, so far as this is effected by wire gauze screens and mosquito curtains, which are expensive and require careful handling, the use of the measure must be limited to the wealthier classes.

Much I believe could be effected by improving the design of living rooms and dormitories. It seems obvious that a well ventilated white-washed room will

afford less shelter during the day to mosquitoes than a dark dingy room. Anointing the body with substances offensive to mosquitoes is useful on occasion.

Of the two radical measures, one aims at the extirpation of mosquitoes by abolishing their breeding places or destroying the eggs, larvæ or mature insects, the other aims at destroying the sporozoon by the administration of quinine, and there has been much controversy regarding the merits of the two measures. It has always seemed to me to be unfortunate that so many of the writers who contribute their views on this controversy to the public press have not been at the pains to study the original accounts of the experiments on which any opinion of value must be based. The consequence of so much wild writing has been to confuse the issue, and not only the intelligent layman, but even medical men have been led astray. It is obvious, if malaria is due solely to the bites of anopheles mosquitoes, that the extirpation of these mosquitoes will abolish malaria. It will be admitted by everybody that the continuous use of quinine, even for a short time during the year, is inconvenient and unpleasant to the individual and difficult to carry out among a community. It is therefore evident that the best way to get rid of malaria is to destroy the mosquitoes. The only questions are, Can it be done? and, if it can, at what cost? It has been successfully done at Ismailia, but in conditions which were extraordinarily favourable, such as, I fear, occur very rarely, if they occur at all, in India. Ismailia was built about 35 years ago by the Suez Canal Company as a model town. It is situated on the shore of the bitter lake Timsah, with the desert behind it. The water supply is derived from the fresh water canal. In his report to the Liverpool School of Tropical Medicine, published in January 1903, Major Ross pointed out that "almost the whole of the irrigation system of Ismailia is free from larvæ and is unfavourable to their propagation," and that "the waters which really occasion malaria are the most shallow and insignificant surface pools, which could be filled up and drained away without difficulty and without detriment to cultivation or irrigation," indeed, he remarked, "mosquitoes can be extirpated with great facility at Ismailia, in fact with much greater facility than in any other town I have seen." Fever is said to have appeared in Ismailia in 1877, but it was never severe, and only three or four pernicious attacks had occurred from the commencement of the epidemic until 1902. Major Ross says "The illness does not appear to be of such a severe type as I have met with in parts of India and Africa; and no deaths have been reported." The population of the town is 7 or 8,000; the Canal Company is the controlling force everywhere; there are no prejudices to overcome; there is no lack of money; the soil is sandy and the rainfall averages less than two inches in the year. Compare these conditions with those of any malarious town in India. The Ismailia experiment proves that the extirpation of mosquitoes to a degree sufficient to abolish malaria is possible, and so far it is a valuable lesson to Indian administrators, but surely it is futile to say that because success was achieved at Ismailia it should be achieved in the same manner in Indian towns. I have said nothing of the expense.

We may now turn to a place where operations against mosquitoes were less successful—Mian Mir. This cantonment was deliberately chosen by the Royal Society's Commissioners, to whom Captain James was attached as a representative of the Government of India, (1) because malaria was prevalent in it, and (2), because it was thought that the conditions for the destruction of mosquitoes

were favourable. The Royal Society's Commissioners' experience in Africa had led them to doubt the practical value of operations against mosquitoes in the moister regions of the world, but they thought that such operations would be successful in the semi-desert conditions of Northern India. Mian Mir differs from Ismailia in most particulars, two of which are of special importance—the soil is impervious and the rainfall averages about 22 inches. The first year's (1902) operations were carried out by Captain James. His conclusion was that "mosquito destruction if it can be carried out successfully, will effectually banish malaria," and "the chief drawback to mosquito destruction is its difficulty and expense". The second year's (1903) operations were carried on by Lieutenant Christophers. His conclusions were "The destruction of anopheles within an area by attacking their breeding places is extremely difficult. Although large numbers of pools were filled up and drained, and millions of larvæ destroyed by oil, adult anopheles were still abundant"....." The mere obliteration of local breeding-places is useless. In Mian Mir almost complete absence of breeding was ensured to a distance of over half a mile, but adults still appeared in large and increasing numbers in the area."....." A distinct effect was produced upon the malaria of troops and on the endemic index of the bazars. This was, however, only evident in the beginning of the fever season, and could not be maintained." ....." The failure of the operations appeared to be due to the passage of adult anopheles into the area from without."

A great deal was learned from the operations in Mian Mir. Before they were undertaken it was thought that fever carrying mosquitoes bred in still pools of water, and could fly at most for a few hundred yards. It was discovered at Mian Mir that fever carrying mosquitoes breed not only in pools, but in running water and that they can fly for half a mile; consequently such operations as can be carried out by a mosquito brigade were of very little use in Mian Mir. The critics of the operations did not, however, pause to consider matters of this kind, "Why," they said, "did you limit your operations to an area of four miles?," "What," they continued, "is the use of filling up and oiling puddles when there are channels of running water in which anopheles breed?" it seems to me that this was hardly fair.

The second phase of the Mian Mir experiment began with the extensive works undertaken by the military authorities; the results obtained are being fully examined elsewhere. Before leaving Mian Mir there is one matter to which reference must be made. It has been said that the failure of the operations at Mian Mir has led to the neglect of anti-mosquito work in India. I do not think this is the case. All the Mian Mir experiment showed was that success in operations against mosquitoes is not so easily gained as some people say, and no one who reads the excellent reports by Major Ross on the work at Ismailia and by Captain James and Lieutenant Christophers on the work at Mian Mir will deny that this is correct. During the last ten years the energies of local Governments and municipalities have been very fully occupied in dealing with plague, and less money has been available for the prevention of malaria than might otherwise have been the case. But a great deal has been attempted. If we have erred in giving too much attention to quinine prophylaxis and too little attention to mosquito destruction, we have erred in the best company. Professor Angelo Celli of Rome, whose experience is greater than that of anyone else, at any rate in Europe, finds that, although the destruction of mosquitoes is possible in the laboratory and in small areas the difficulties in extensive areas are generally insuperable.

Important information regarding malaria in villages was obtained by the Drainage Committee appointed by the Government of Bengal in 1906 to enquire into the conditions of the drainage of the Presidency Division and their connection with malaria. Captain Stewart and Lieutenant Proctor of the Indian Medical Service were the experts appointed to assist the Committee. In the districts of Jessore, Nadia and Murshidabad, they found that malaria as estimated from the spleen rates of children under 12 years of age, was, on an average, much less prevalent in villages situated on the banks of live rivers and on dry land than in villages situated on the banks of dead rivers or *bheels*, while in villages surrounded by thick jungle the spleen rate (68·8) was more than twice as high as that (26·2) in villages with little jungle around them.

The success or failure of minor operations against mosquitoes appears to me to depend upon the state of the drainage. Where drainage is perfect, as in the case of Ismailia, the inhabitants can exterminate mosquitoes with little trouble; but where drainage is non-existent or bad, as at Mian Mir, it is practically impossible, by any means at present within their reach, for the inhabitants to destroy the mosquitoes. In any scheme, then, which has for its object the removal of malaria from an area, the first step is to ascertain the condition of the drainage and, if it is imperfect, how it can be improved so as to prevent water-logging of the soil, not only in ordinary seasons, but in seasons of extraordinary rainfall. In the drier parts of India it seems it is abnormally heavy rainfall that is the danger. Last year in the west of the United Provinces the monsoon rainfall was about normal, but all the rain fell in two months, and fever was severely epidemic; in Berar the monsoon rainfall was 24 per cent in excess, but it took nearly four months to fall, and fever was less prevalent than usual. Drainage schemes are costly and they require a long time to carry out even when the funds are available, and in the meantime the choice must often be made between measures against mosquitoes and the administration of quinine—unless, as may often be the case, it appears to be advantageous to use both these measures. In making the choice all the circumstances of the case must be taken into consideration. To take extreme examples. If we have a town containing a few pools which are the only sources of the anopheles mosquitoes infecting the inhabitants, it is obvious that the remedy is to drain or fill up the pools. If we have a small village surrounded by a swamp in which anopheles breed, it is evident that quinine prophylaxis is the best remedy. In India we have all the gradations between these two extremes, but those approximating to the village in the swamp are in the enormous majority.

An obstacle that has stood in the way of quinine prophylaxis is the doubt entertained by the general public and some members of the medical profession of its efficacy. This doubt is in most cases founded upon experience—medical men have found persons who have apparently been regularly taking quinine get fever, and most practitioners have come across cases in which quinine seemed to fail to cure malarial fever, while instances are not uncommon in which the results of quinine prophylaxis in a community have been exceedingly unsatisfactory. Sometimes the cause of failure is not far to seek—the drug has not been taken at all, the dose has been too small or it has been taken irregularly. There are other instances, however, that are by no means easy to explain, and whoever has studied the recent researches into the fate of quinine in the animal body will recognize how thickly beset with

difficulties the subject is and how great is the necessity for further research, particularly in this country which differs so widely from Europe in respect of the food of the people, metabolic changes and conditions of climate. It is possible that a race of malarial parasites that is immune to quinine may be developed. Fresh water amœbæ may be gradually habituated to salt water, the infusorian Stentor kept in a weak solution of corrosive sublimate becomes tolerant of a solution containing four times the quantity of the poison that is fatal to stentors taken from pure water. Trypanosomes frequently develope, in an animal being dosed with atoxyl, a race of trypanosomes that is immune to that drug, and they produce descendants in a new animal host which retain this immunity. Giemsa and v. Prowazek succeeded in obtaining races of Colpidia that could live in fairly strong solutions of quinine. The parasite of malaria is far more closely adapted to its normal surroundings than the protozoa I have mentioned, but it seems possible that quinine-fast plasmodia may be produced, and we may speculate regarding the nature of such an immunity and whether it would be retained after sexual reproduction and passage into a new human host. Persons infected with a quinine-fast parasite would be in an unhappy position. It appears, however, that the prejudice against the use of quinine as a prophylactic entertained by a few medical men is hardly logical. If it is admitted that quinine is *the* remedy for malarial fever and that it acts by killing the malarial organisms—propositions which few medical men will be found to deny—it is surely reasonable to believe that it will be as useful as a preventive as it is as a cure. When it is realized that it is fatal to the vegetative form of the parasite, but may be ineffectual against the sexual forms, it will be admitted that it is even more useful as a preventive than as a cure. There is much evidence accumulated in this country to show that quinine swallowed regularly in sufficient doses is very nearly a complete preventive of malarial infection, or at any rate of the clinical manifestations of malarial fever. The most striking evidence of the kind is afforded by Colonel Braide's experiment in the Punjab in the autumn of 1908. The results of this experiment have already been detailed on pages 75 and 76 of this report and the success attained justifies a very critical examination of any reported failure.

I have laid stress upon the danger of comparing the statistics respecting the inmates of our prisons with the statistics of the general population, and I think it would be just as unsafe to believe that because quinine prophylaxis may, with considerable difficulty, be made a complete success in prisons it will be equally successful among the people. The prisoners are under great advantages, their lives are regularly ordered, they are well housed, well fed, protected against the vicissitudes of the weather, and rarely undergo any exceptional bodily exertion. Quinine is given to them systematically in sufficient doses under supervision, and when they are attacked by fever every means is used to ensure the quinine acting at an advantage. Among the general public many know that quinine is a remedy for malarial fever and are eager to get it when they are suffering, but many are prejudiced against it, and probably the majority have never heard of it. We shall therefore have to take means to bring the advantages of quinine before all those who live in malarious places, and not only eradicate prejudices, but educate the people to use the quinine in sufficient quantity and at the right time. The best preparations for the use of adults and children will have to be selected; and probably much will depend upon the way in which the drug is dispensed. The correct dose must be determined, and I

think it would be of advantage to issue the drug in tabloids or powders equal to the minimum dose sufficient for prophylactic purposes, with directions that the single dose should be repeated a certain number of times at specified intervals as a cure. It is essential, I think, that it should be recognized that the distribution of quinine cannot be made self-supporting, and in view of economy, if for no other reason, very careful enquiries will be necessary regarding the needs of different localities. In many places no quinine is necessary at all; in others it is required only for a short time in certain years; in others it is required every year, but only at a certain season, and in yet others there is need for its continuous use.

Although our knowledge of the etiology of malaria and its treatment is fairly extensive, it is still wanting in continuity and completeness, and the scientific study of its epidemiology is only beginning. Some of the gaps in our knowledge regarding the possibilities in the life cycle of the parasite must be filled before we can hope to master the epidemiology of the disease to which it gives rise, and we cannot devise the simplest and best preventive measures until the epidemiology is thoroughly understood. As I have endeavoured to indicate, we have little exact knowledge of the distribution of malaria in the country, of the local conditions which favour it, and of the best means to render these causes inoperative. It will be evident that the defects in our knowledge may be classified as follows:—

(*a*) Questions of administration, *e.g.*, the best agency for the distribution of quinine.

(*b*) Questions that can be solved by experts on the spot, *e.g.*, the causes of disease and death and the distribution of malaria in a district; and

(*c*) Questions that can be solved only by highly trained experts with the resources of a well appointed laboratory at their disposal.

There is reason to hope that a permanent organisation for dealing with these and other matters relating to malaria in India will shortly be established.

Fevers in Bengal.

Although the recorded death-rate from fevers in Bengal during 1908 was 23·44 per thousand as compared with 23·18 in 1907 there is reason to believe that on the whole malaria was considerably less prevalent than in that year. From October to December the recorded mortality from fever was less by 114,682 than during the same months of 1907 and the highest figure for any month was recorded in June when the severe epidemic of cholera was at its height. It is noteworthy also that the districts of Palamau, Birbhum, and Gaya which stood first, third, and fifth, respectively on the list of districts with the highest fever rates for the year were among the five districts with the highest cholera rates and that in these districts the seasonal incidence of the recorded fever mortality corresponded more nearly to the seasonal incidence of cholera than to the usual incidence of malaria. The provincial Sanitary Commissioner states that in comparison with previous years there was no serious outbreak of malaria anywhere in the province.

Fevers in Eastern Bengal and Assam.

In Eastern Bengal and Assam 667,146 deaths from fever were recorded (22·37 per thousand of population) as compared with 631,197 deaths (21·17 per thousand) in 1907. In comparison with that year a disproportionately large number of fever deaths were recorded during March, April and May when cholera was severely prevalent and as in Bengal it is not improbable that to this cause must be ascribed

the increased death rate recorded as due to "fever". The provincial Sanitary Commissioner has reported that no serious outbreak of malaria occurred in any district and the Civil Surgeon of the Dinajpur district reports that in spite of the high death rate recorded (36·75 per thousand) malaria was less prevalent than usual and that the admissions to the dispensaries decreased by nearly 7,000. The deaths recorded as due to kala-azar numbered only 1,786 as compared with 2,227 in the previous year. Deaths were reported from all districts but the mortality from the disease has steadily declined since 1902, in which year there were 6,319 deaths.

Fevers in the United Provinces.

The unusually severe epidemic of malaria that visited the United Provinces in the autumn of 1908 and the climatic and other conditions associated with it have already been referred to in preceding sections of this report. The total number of deaths ascribed to fevers during the year was 1,970,319 and the death rate was 41·31 per thousand as compared with a total of 1,350,405 and a death rate of 28·31 in 1907. Until August the figures compared not unfavourably with those of the previous year, but after that month they rose quickly to double or more of the usual number so that in the last four months more than a million deaths were ascribed to fever as compared with about half a million in the last quarter of 1907. The disease attacked rich and poor and every class alike, but the mortality occurred chiefly among the very young, the very old, and those whose food supply had been limited owing to the high prices prevailing during the two preceding years. The districts most severely affected were, Muttra, Budaun, Bareilly and Bulandshahr in all of which the fever death rate was over 65 per thousand, and as regards towns with a population above 10,000 the highest rates were recorded in Kairana (105 per thousand) and Shikohabad (91 per thousand). About 7,000 lbs. of quinine were distributed gratuitously in the affected districts. Since October 1908 a selected officer has been on special duty for the investigation of malaria in these provinces.

Fevers in the Punjab.

The Punjab was the other great area of British India most severely affected by the malaria epidemic of 1908 and the recorded deaths from fever numbered 697,058 as compared with 405,481 in 1907. The deaths under this heading until the end of August were less by 8,000 than in the corresponding period of 1907, but during the remaining four months the figures exceeded those for the last quarter of that year by nearly 300,000. The fever death rate for the year was 34·66 per thousand against 20·16 in 1907. According to Captain Christophers, I.M.S., who was deputed to enquire into the conditions associated with the extraordinary prevalence of the disease, there were two chief epidemic areas, one in the north involving Gujrat, Gujranwala, and Shahpur, the other in the south-east involving Gurgaon, Delhi, and parts of Rohtak. Smaller epidemic areas occurred round Ludhiana and Jullundur. Since 1868 there have been nine years in which epidemics of a similar character, but sometimes more and sometimes less severe and widespread, have occurred in this province. The chief feature of these epidemics is the occurrence at certain central portions of the epidemic areas of foci in which the disease is so prevalent and severe that the mortality figures can scarcely be credited. Such foci Captain Christophers has termed "fulminant areas" and in the epidemic of 1908 they existed in the north over Gujrat, Amritsar, and Bhera, and in the south over Gurgaon. The fever death rates for the districts in which these places are

situated (the only figures by months which are available) convey a very inadequate idea of the mortality caused in different *thanas* and small towns, but it may be noted that the following were the annual fever death rates for the month of October in the districts referred to: Gujrat 169 per thousand, Amritsar 171 per thousand, Shahpur (in which Bhera is situated) 140 per thousand, and Gurgaon 212 per thousand. The heavy floods which accompanied the epidemic in all districts rendered any attempt to deal with breeding places of mosquitoes impracticable, but measures were promptly taken for the distribution of quinine gratuitously on a large scale and eight moveable hospitals worked continuously in the areas most severely affected. The central agency recently established in this province for controlling the distribution of quinine alone disposed of 6,000 lbs. of the drug and in addition large quantities were distributed by local bodies and organisations.

Fevers in the North-West Frontier Province.

In the North-West Frontier Province 50,795 deaths from fevers were recorded during 1908, as compared with 52,361 in 1907, the ratios per thousand of population being 26·62 and 27·44, respectively. The autumn was, however, more malarious than that of 1907 and during October and November the fever deaths exceeded those for the same months of that year by 3,746. In the town of Peshawar the death rate from fevers was 22 per thousand as compared with 18 in 1907.

Fevers in the Central Provinces and Berar.

The peculiar distribution of the rainfall and of malaria in the Central Provinces and Berar during 1908 have been noticed in a preceding Section of this report. Among the civil population the number of deaths recorded as due to fever was 217,773 and the death rate 18·16 per thousand as compared with a total of 213,908 and a rate of 18·00 in 1907. The highest mortality was recorded during September, October and November, but the rise in comparison with the figures of other months was not great, which supports the opinion of the provincial Sanitary Commissioner that no outbreak of malaria sufficiently serious to require unusual measures occurred during the year. It is stated that in most towns attention has been paid to the general improvement of drainage and to filling up burrow pits and other hollows, depressions, small pools, and puddles.

Fevers in Madras.

In the Madras Presidency the death rate recorded from fevers was, as usual, much lower than in any of the other chief provinces. The total number of deaths recorded under the heading was 295,834 against 284,430 in 1907, giving ratios of 8·0 and 7·8 per thousand, respectively. The rates for districts varied from 19·9 per thousand in Vizagapatam and 19·8 in Ganjam to 1·5 in Bellary and 1·4 in Anantapur. The mortality from this cause varies very little from month to month in this presidency, but as usual the largest number of deaths were recorded in December.

Fevers in Bombay.

In the Bombay Presidency the number of deaths recorded as due to fevers was 243,372 (13·17 per thousand of population) as compared with 260,329 (14·09 per thousand) in 1907. The number is the lowest recorded since 1899. The districts with the highest mortality were, as usual, Ahmedabad (25·73), Broach (23·26) and Sukkur (20·72) and a comparatively high ratio was also recorded in the district of the Panch Mahals in which it is said outsiders are deterred from settling on account

of its bad reputation for malaria. The community engaged in the manganese mining industry in Halol Mahal is said to have suffered greatly from the disease during 1908.

Fevers in Burma.

In Lower Burma the death rate from fevers in 1908 was 9·63 per thousand as compared with 10·28 in 1907 and in Upper Burma it was 8·23 as compared with 7·53. In some of the districts which are reputed to be most malarious such as the Pyapon, Myitkyina, Katha, Ruby Mines, Salween and Upper Chindwin districts the registration of vital statistics is not in force.

Fevers in Ajmer-Merwara and Coorg.

In Ajmer-Merwara 14,682 deaths (30·79 per thousand) were ascribed to fevers as compared with 11,117 (23·31 per thousand) in 1907 and in Coorg the numbers and the rates were respectively, 5,028 and 27·85 as compared with 4,868 and 26·95.

Sale of pice packets of quinine.

In Bengal there was, as in the two preceding years, a reduction in the amount of quinine sold, 13,307 parcels (each parcel containing 102 seven-grain pice packets) having been sold as compared with 22,497 parcels in 1907 and 32,189 parcels in 1906. The largest quantity of the drug was sold during the last five months of the year, when fevers were prevalent. Measures have been taken since the close of the year for further extending and popularising the sale by cheapening the price and issuing the drug, not only in the form of powder as at present, but also, and chiefly, in small tablets.

In Eastern Bengal and Assam the total number of parcels sold was 33,608 against 18,993 in 1907. In the district of Bakerganj over 19,000 parcels, which represents more than two million powders, were sold. Various plans for pushing the sale of the drug have recently been adopted in this province, among them being the enlistment of village school-masters as agents.

In the United Provinces, in addition to the gratuitous distribution of about 7,000 lbs. of quinine, 2,300,230 pice packets were sold during 1908 against 722,377 in 1907. The number is little greater than was sold in one district of Eastern Bengal and Assam during the same year and the provincial Sanitary Commissioner considers that the form in which the drug is distributed is unsatisfactory and that the agency for its distribution is not sufficiently far-reaching.

In the Punjab quinine was distributed gratuitously on a large scale by numerous agencies but no details regarding the sale of pice packets are given in the provincial report.

In the Central Provinces and Berar 3,312 parcels, each containing 102 seven-grain pice packets, were sold during the year as compared with 3,361 parcels in 1907. Of the total number 3,141 parcels were sold by post-masters and 171 by *patwaris*. The supply of 643 parcels to post-masters, stamp-vendors, schoolmasters, and *patwaris*, as an advance, has not been taken into account, as the sales from this supply are not known.

In Burma 908,092 pice packets of quinine in powder were sold in 1908 through the agency of district officers and vaccinators but this number does not include the sales at post offices, of which the account had not been received when the provincial Sanitary Report was written.

Dysentery and diarrhœa.

In 1908 the statistics of dysentery and diarrhœa among the general population were, possibly on account of the prevalence of cholera, of little value even as an indication of the increase or decrease of these diseases in different years; for despite the existence of every condition that it might reasonably be supposed would increase their prevalence and in the face of the indication afforded by the jail statistics that dysentery was prevalent among the general population in an unusually widespread and fatal form, the number of deaths recorded under this heading was only 285,921 as compared with 282,191 in 1907, a year during which, at any rate in the jails, dysentery was less common and less fatal than in any previous year. It is noteworthy also that in certain provinces, such as the United Provinces and the Central Provinces, where from the great rise in the mortality from dysentery in the jails we should have expected an even greater rise in the mortality among the free populations the statistics relating to those populations show decreases, in the United Provinces from 22,368 deaths in 1907 to 19,388 in 1908 and in the Central Provinces from 46,820 to 40,760. In the Madras Presidency, also, where the death rate from dysentery among the jail population rose from 2·85 per thousand in 1907 to 7·05 in 1908 the recorded death rate from dysentery and diarrhœa among the free population remained the same in the two years, namely, 1·7 per thousand. The recorded death rate per thousand of population for British India as a whole was 1·26 as compared with 1·25 in 1907 and 1·20 the rate for the quinquennium.

In Bengal 64,899 deaths from dysentery and diarrhœa were recorded in 1908 as compared with 51,670 in 1907, the death rates for the two years being 1·28 and 1·02 per thousand respectively. The highest death rate recorded in districts was 9·41 in Puri, in regard to which it was reported that as a result of the prevailing scarcity the poorer classes had been obliged to use roots, *sag*, and similar articles as food.

In Eastern Bengal and Assam 24,853 deaths were attributed to dysentery and diarrhœa in 1908 against 20,463 in the previous year, the death rate per thousand of population being ·83 as compared with ·68. The mortality on tea estates is said to have been especially severe owing to an increased importation of labour from famine stricken districts.

The death rate recorded from dysentery and diarrhœa in the United Provinces was only ·41 per thousand of population, being lower than in any other Province except the North-West Frontier. In the jails the diseases were most prevalent in the autumn but among the general population most deaths were recorded in May and June. The highest death rate registered in districts was 8·38 per thousand in Garhwal.

In the Punjab the deaths of 21,103 persons were ascribed to dysentery and diarrhœa during 1908 as compared with 15,091 during 1907, the death rate being 1·05 per thousand as compared with ·75. The seasonal incidence of the diseases corresponded with that of malaria, the greatest numbers of deaths being recorded in October and November when the malarial epidemic was at its height.

In the North-West Frontier Province only 320 deaths were attributed to dysentery and diarrhœa (·17 per thousand) as compared with 554 (·29 per thousand) in 1907.

In the Central Provinces and Berar the number of deaths from these diseases fell from 46,820 (3·94 per thousand) to 40,760 (3·40 per thousand). The ratio per thousand of population in the Central Provinces was only 2·24 as compared with a ratio of 7·28 in Berar. Several Civil Surgeons have reported that the relatively high mortality from this cause in Berar is due chiefly to the consumption of grain that has been stored for a long time in under-ground pits.

In the Madras Presidency 60,874 deaths from dysentery and diarrhœa were recorded as compared with 60,326 in 1907, the death rate, 1·7 per thousand, having remained the same during the last three years. The greatest numbers of deaths were recorded in January and August when cholera was severely prevalent.

In the Bombay Presidency 40,781 deaths were recorded from dysentery and diarrhœa, giving a ratio of 2·21 per thousand as compared with a total of 53,708 and a ratio of 2·91 in 1907.

In Lower Burma in 1908 the recorded death rate from dysentery and diarrhœa was 1·77 per thousand (9,833 deaths) as compared with 1·61 in 1907, and in Upper Burma it was ·68 as compared with ·47. The urban death rate in Lower Burma was 4·54 per thousand against a rate of 1·36 in rural areas the difference being attributed to less defective diagnosis in the towns.

In Ajmer-Merwara 727 deaths were attributed to dysentery and diarrhœa as compared with 494 in 1907 and in Coorg 408 deaths as compared with 375.

General History of Vaccination.

(For Statistical tables *see* page 78.)

Vaccination in India.

The total number of vaccination operations performed during the year 1908-09 was 9,123,362 a decrease compared with 1907-08 of 46,511, but an increase compared with 1906-07 of 43,059. Decreases occurred in the United Provinces (245,354), the Punjab (38,785), Burma (10,120), Ajmer-Merwara (1,774) and Coorg (668), particulars of which will be found in the paragraphs relating to individual provinces. The primary cases numbered 8,161,297 against 8,351,530 in the preceding year, and revaccinations 962,065 against 818,343—a decrease of 190,233 in the former and an increase of 143,722 in the latter. Decreases in both classes of work were recorded in the United Provinces, Burma, Ajmer-Merwara and Coorg, while in Bengal, the Punjab and Madras the decrease was in primary cases only, and in the North-West Frontier Province in revaccinations only. Taking all provinces together, primary cases succeeded at the rate of 97·47 per cent compared with 97·65 per cent in 1907-08, and ranged from 99·34 per cent in Bengal to 92·41 in Coorg: in revaccinations the rate was 73·44 per cent against 75·45 per cent the year before and the range between 92·11 in Ajmer-Merwara and 59·99 in Burma. The mean number of operations performed by each vaccinator was 1,507 compared with 1,480 in 1907-08, there being the usual differences between provinces, the means varying between 2,591 in the North-West Frontier Province and 2,531 in the Punjab, and 1,077 in Bengal and 853 in Ajmer-Merwara.

There was again a fall in the amount of vaccination work performed at dispensaries, the total declining from 199,245 operations in 1907-08 to 191,242 in 1908-09. In four provinces there was an increase, of which the largest was 11,834 in Bengal followed by 1,551 in the Central Provinces, and in six there was a decrease, of which the greatest occurred in Eastern Bengal and Assam (15,547) and Bengal (5,044).

The mean proportion of population successfully vaccinated was 35·93 per thousand of the census population, compared with 36·07 in 1907-08, the highest ratio being again recorded in Coorg, 50·68, while the lowest was recorded in Ajmer-Merwara, 26·13. On an estimated birth rate of 40 per thousand of the census population, 43·87 per cent. of the infants were successfully vaccinated, which though lower than the rate of 44·36 in 1907-08 is higher than that in any of the three preceding years. There were great differences in the provincial rates, the highest, 76·98 per cent was recorded in the Central Provinces and the lowest, 12·15 per cent in Coorg.

The total cost of the department was £100,702 to which it rose from £92,672 in the previous year, every province, except Ajmer-Merwara, contributing to the rise. The mean cost of each successful case was $2\frac{5}{6}d.$ or $\frac{1}{4}d.$ more than in the year before. The highest rate was $8\frac{15}{16}d.$ in Bombay and the lowest $1\frac{1}{4}d.$ in Eastern Bengal and Assam.

Vaccine lymph.

Particulars as to the lymph supply of each province will be found in the succeeding paragraphs. The more important changes were the closing of the lymph depot at Lucknow where it is no longer required, the opening of the vaccine lymph depot at Belgaum whence preserved lymph will be distributed throughout the Bombay Presidency including Sind, and the introduction of payment for all vaccine lymph issued by the Punjab vaccine depot to prevent undue waste by demands in excess of requirements.

Bengal.

The vaccination operations in Bengal in 1908-09 totalled 2,241,576 compared with 2,058,371 in 1907-08, an increase of 183,205 against an increase of 21,098 in the previous year. The increase is the more satisfactory because it occurred in both primary cases and revaccinations. There are 34 districts in the province, in 25 of which the totals were larger than in the previous year. The most noticeable increase was of 90,628 operations in the Tributary States of Orissa, for which, however, no explanation has been furnished. The other more important increases were recorded in the districts of Cuttack (17,224), Palamau (14,390), Midnapore (13,688) and Burdwan (11,614). The increase in Cuttack is a result of the employment of a larger number of vaccinators, of the better organization of work and of the efforts of the special inspector of vaccination for Orissa whose appointment has been justified. Elsewhere the greater prevalence of small-pox was the principal cause of more vaccination work being done. In four only of the nine districts in which decreases occurred were the figures considerable, *viz.*, Darbhanga (14,156), Ranchi (7,886), Hazaribagh (7,657) and Bhagalpore (5,248). In the three first the prevailing scarcity compelled the labouring classes to leave their homes in search of employment, while in Bhagalpore the larger number of vaccinations in the preceding year and a lower small-pox mortality explain the decrease. In primary cases the quality of work was practically the same as in 1907-08, the percentage of success in the two years being 99·34 and 99·32, respectively, but in revaccination the rate fell to 61·78 from 72·96 the year before. Paid vaccinators performed on the average a larger number of operations than the licensed operators, but except in the case of revaccinations by District Board vaccinators, the licensed vaccinators returned a higher successful rate. The work of the vaccinators attached to municipalities, dispensaries, etc., showed an improvement, the primary cases increasing from 88,481 to 90,874 and revaccinations from 42,466 to 51,907. In the former the percentage of success was 98·60 and in the latter 60·39, against percentages of 98·65 and 68·70, respectively, in 1907-08. There was a fall in the number of primary operations on tea gardens and at factories, from 4,279 to 2,945, and a remarkable fall in revaccinations from 11,421 to 1,403, which is not explained. The ratios of success which had been 95·02 and 78·92 per cent, respectively, were 98·91 and 42·05. The steady progress in the protection of infants continued, 43·91 per cent. on an estimated birth rate of 40 per mille compared with 42·39 per cent in 1907-08, being successfully vaccinated. There was a satisfactory improvement in Puri which had been most backward in vaccination especially in respect of infants under one year of age, but the hearty co-operation of the District Magistrate and the Civil Surgeon, combined with the efforts of the special inspector of vaccination for Orissa, induced parents to offer their children for vaccination even in places in which they have hitherto always resisted it.

Primary operations during the year were conducted with lymph direct from the calf, with lanoline lymph and by the arm-to-arm process. The percentages of success by each method were—(the ratios in brackets are for the preceding year), 99·49 (99·01), 98·09 (98·59) and 98·77 (98·99), respectively. In revaccinations the corresponding rates were 76·83 (74·70), 59·59 (64·77) and 83·41 (75·73).

The department cost £14,515 against £13,578 in 1907-08, and each successful case $1\frac{1}{12}d.$ or $\frac{1}{12}d.$ less than in the previous year.

The quantities of lymph manufactured at the Calcutta and Darjeeling Vaccine Depots were 420,945 and 69,073 grains, respectively, compared with 318,447 and 69,009 grains, respectively, the year before, which may be regarded as evidence that the arm-to-arm process is being steadily replaced by the use of prepared lymph.

The Nepal Darbar and the Sikkim State obtained 250 and 1,130 grains of lanoline vaccine paste, respectively, against 110 and 770 grains in the previous year.

Eastern Bengal and Assam.

The improvement in the work of the Vaccination Department in the province in 1907-08 when there was an increase of 40,612 operations, continued in 1908-09 when with an increase of 91,014 the total number was 1,449,658. Of the total, 1,349,379 were primary cases and 100,279 revaccinations, showing increases of 65,030 and 25,984, respectively, on the results of the previous year. Of the 28 districts, an increase on the previous year's work occurred in ten, being most marked in Mymensingh, Faridpur, Bakarganj, Dinajpur and Rangpur, in each of which there were upwards of 11,000 operations more than in the preceding year. The increase in these districts was due mainly to greater activity of the staff in consequence of the prevalence of small-pox in the last quarter of the year 1908, and in one district the people themselves sought vaccination. The principal decreases occurred in Noakhali, the Naga Hills and Tippera. No explanation is given of the decrease in the first and last named, but in the Naga Hills it was due to the substitution of Angami Nagas, specially trained as vaccinators, for Assamese vaccinators, a change not acceptable to the people. It is satisfactory to note that in the Kamrup district further progress was made in overcoming the opposition of the Mahapurushyas and in the Lakhimpur district of extending vaccination among the Muttocks and also among the Miri tribes, 1,289 of the latter having been vaccinated for the first time. The quality of work was better in 1908-09 than in the preceding year in both classes of operations—in primary cases 98·76 per cent successful against 98·23 per cent and in revaccination, 74·26 against 70·21 per cent.

The amount of vaccination work at dispensaries fell from 20,168 cases in 1907-08 to 4,587 in 1908-09, the decrease is explained by the transfer to the regular vaccination staff of areas around hospitals in the Cachar and Sylhet districts and at most of the dispensaries in the Assam Valley districts in which vaccination used to be performed by Hospital Assistants on the staff of the hospitals. Vaccination at dispensaries has not, however, ceased altogether as a small stock of vaccine is maintained in order that the Hospital Assistant and Compounder may be able to vaccinate people who apply to the dispensary for the

operation. The quality of the work was not as good as in the preceding year, *viz.*, 96·62 per cent against 98·40 per cent successful in primary cases, and 74·96 against 81·34 in revaccinations. Of the total of 19,858 operations on tea gardens 19,051 were primary and 807 revaccinations, which succeeded at the rates of 96·56 and 95·04 per cent, respectively, the figures showing an improvement on the results of the previous year.

On an estimated birth rate of 40 per thousand, infants under one year of age were successfully vaccinated at the rate of 30·65 per cent against a rate of 30·76 in 1907-08. In towns 66·8 per cent of the available children were successfully vaccinated against 52·15 per cent in 1907-08, to which the rate had fallen from 68·70 in 1906-07. In some places there are objections on the part of parents to have their children vaccinated during the first year of life.

The quality of vaccine manufactured at the Shillong depot was on the whole reported to be excellent; the number of tubes loaded increased by 283,335 to 1,866,457, and the cost per tube was $\frac{7}{40}d.$ against $\frac{1}{5}d.$ in 1907-08.

The cost of the department which had been £6,806 in 1907-08, increased to £7,374, the average cost of each successful case being the same as in the previous year, *viz.*, $1\frac{1}{4}d.$

United Provinces.

The work of the Vaccination Department in the United Provinces was seriously affected by the widespread prevalence of malaria and of famine conditions. The total number of operations performed fell from 1,702,139 in 1907-08 to 1,456,785 in 1908-09. The decrease was more marked in the First Circle than in the Second Circle, except in the case of revaccinations, owing to the districts which suffered most from malaria being almost all situated in the First Circle. Of the 50 districts, decreases occurred in no less than 40. Of the total operations 1,325,443 were primary cases and 131,342 revaccinations, compared with 1,562,231 and 139,908, respectively, in the preceding year; the percentage of success in the former was 96·49 against 97·85, and in the latter 80·84 against 83·92. At dispensaries only 765 operations were performed compared with 1,442 in 1907-08, but although the general unfavourable conditions affected the vaccination work at dispensaries, but little such work is done at any time because children are either vaccinated at their homes or at vaccination stations.

Estimating the birth rate at 40 per thousand, 41·39 per cent of the infants were successfully vaccinated. The fall from the rate of 49·94 per cent in the previous year is explained by a smaller number of children being available owing to malaria, which not only caused a heavy mortality, but rendered the majority of the survivors unfit for vaccination, while famine conditions, and to a certain extent small-pox, measles and a low birth rate, contributed to reduce the number of children available for the operation. In towns a larger number of children were successfully vaccinated than were calculated to be available, but this is explained by children born outside being brought in and vaccinated, and to the ages of children being often incorrectly stated.

The Bovine Lymph Depot at Patwa Dangar now supplies the whole province and the local depot at Lucknow was therefore closed. The working of the Patwa Dangar depot was very successful during the year; not only was the quantity of lymph issued greater than in any previous year, but the income also showed a

satisfactory increase. Endeavours are being made to replace arm-to-arm vaccination by the use of calf lymph, but this is to be effected gradually.

The cost of the department was £11,842 against £10,835 in the previous year, the increase being due to necessary expenditure at the Bovine Lymph Depot and to there having been two full-time Deputy Sanitary Commissioners for about 10½ months of the year. The average cost of each successful case was $2\frac{1}{32}d.$ against $1\frac{7}{32}d.$ the year before.

Punjab.

The effects of the epidemic of malaria fever in the Punjab in the autumn of 1908 is shown in the vaccination statistics of the province for the year 1908-09; when compared with the preceding year there was a decrease of 38,785 vaccination operations. The primary cases were 59,368 fewer, but revaccinations were 20,583 more than in 1907-08. The decrease in the primary work is said to be due to the effects of the epidemic of malaria and not to laxity on the part of the vaccinating staff, as although the number of children available for vaccination was 10·43 per cent less, the ratio of successful primary vaccinations was 4·76 greater. It is explained that while the people generally appreciate vaccination, particularly the first operation, the majority object to revaccination regarding it as unnecessary or a hinderance to work; moreover there is a lack of interest on the part of persons who should co-operate with the vaccinators, indeed, in one district the Civil Surgeon considers that with the co-operation of the people the work of vaccination could be performed with half the present staff. In order to popularize the operation, it is proposed to introduce house-to-house vaccination which will save time as vaccinators will proceed to houses where there are children to be vaccinated, and this will save people the exertion and annoyance of taking children to a distance. With the decrease in the number of primary cases, there was also a fall in the percentage of success from 99·03 in 1907-08 to 98·43 in 1908-09, but in revaccinations the rate rose from 75·91 to 76·93 per cent.

On an estimated birth rate of 40 per thousand, 51·49 per cent of the infants were successfully vaccinated against 56·51 per cent in 1907-08 and 60·05 per cent in 1906-07. In towns in which the Vaccination Act is in force 82 per cent of the available children were protected, and in the towns to which the Act does not apply 64 per cent; the corresponding rates in the previous year were 77 and 62 per cent respectively.

According to the proposal made last year, vaccine lymph was issued on payment throughout the province in order to check demands in excess of requirements.

The case and insertion success of the vaccine supplied was, in primary cases, 97 and 96 per cent respectively, and in revaccinations, 77 and 73 per cent, all slightly higher rates than in 1907-08, except as regards revaccination insertions in which the rate was lower.

The cost of the department again showed an increase, rising from £6,941 in 1907-08 to £7,651 in 1908-09, and the cost of each successful case from $2\frac{7}{32}d.$ to $3\frac{1}{32}d.$

In the large native states in the province there was also a decrease in the total number of vaccinations performed which, as in the province proper, is attributed to the autumn epidemic of malaria. The following are the particulars by states—the figures in brackets relate to the preceding year. Patiala, primary cases 42,500 (45,776), revaccinations 24,106 (22,455); Bhawalpur, 8,344 (19,665) and 119 (322); Kapurthala, 3,651 (3,796) and 49 (766); Nabha, 1,607 (1,578), Jhind 6,168 (6,208), no revaccinations; and Faridkot 3,485 (3,720) and 52 (36).

North-West Frontier Province.

It is satisfactory to record that after two successive years in which the total number of vaccination operations declined, there was in 1908-09 an increase of 513 operations compared with the previous year. Of the total of 91,368 operations, 81,181 were primary cases and 10,187 revaccinations, the former showing an increase of 4,832, and the latter a decrease of 4,319. The increase in the total is all the more satisfactory as work was considerably hampered during the early part of the vaccinating season by the prevalence of cholera which necessitated the employment of several vaccinators on cholera duty. Vaccination is becoming more popular with the people as a result of the use of glycerinated chloroform lymph, and the discontinuance of the use of animal lymph has played an important part in lessening friction between vaccinators and villagers in connection with the provision of animal vaccinifers. The percentage of success was not so high as in the previous year, the rate for primary cases being 98·38 against 99·22 and for revaccinations 82·14 against 88·18. No reason has been given for the fall in the percentages.

As regards dispensaries, in 1907-08, 170 primary operations, all of which were successful, were performed at the Mardan dispensary only. In 1908-09 no vaccination work was done at the Mardan dispensary, but 72 primary operations were performed at the Chakdara dispensary and 609 at the Mastuj dispensary in the Chitral Sub-Agency, the percentage of success being 94·20 and 95·19 respectively.

In the Political Agencies of Kurram and the Tochi there was a marked falling off in vaccination work which is attributed to political unrest on the Kurram border and to the suspicions of the trans-border tribes of Government measures to prevent the spread of cholera. In spite of these suspicions, however, the people of certain villages across the Kurram border sought later the aid of Government vaccinators on the appearance of an epidemic of small-pox. Vaccination was introduced into the Chitral Sub-Agency in supersession of inoculation through the efforts of the Civil Surgeon who trained as vaccinators, two Chitralis who performed 3,276 operations of which 2,949 were primary. In the Shirani country the number of operations increased from 2,605 in 1907-08 to 4,972 in 1908-09, of which 3,106 were performed with glycerine lymph, indicating that the arm-to-arm method is not now in much demand. Excluding the operations at the Chakdara dispensary, no vaccination was done in the Swat Valley; the attempts to secure local recruits as vaccinators were not successful, and efforts are to be renewed.

On an estimated birth rate of 40 per thousand, 60·49 per cent of the children under one year of age were successfully vaccinated, which is 3·45 per cent in excess of the rate in the previous year. As regards municipal towns, in some

the number of children successfully vaccinated exceeded the number available, and in others a large proportion of those available were not protected. The Vaccination Act has not yet been applied to the towns of Peshawar and Lakki.

Glycerinated chloroform lymph was used for the vast majority of the vaccinations, but owing to the limited supply from the Punjab vaccine depôt, it was necessary to resort in the cases of a small number of persons in the Dera Ismail Khan and Kohat districts to the use of animal lymph, and to human lymph for a large number of the Chuhar Khel tribe who unexpectedly presented themselves for vaccination.

No inoculation was reported in the settled districts, and it is satisfactory to find that gradual instruction and the breaking down of long established prejudices is eliminating the inoculator and soon the practice of inoculation should cease altogether in the province.

The cost of the department was £838 or £25 more than in the previous year, and the cost of each successful case $2\frac{5}{12}d.$ or $\frac{1}{6}d.$ more than in 1907-08.

Central Provinces.

Including the vaccinations performed at dispensaries and in the Feudatory States, the total number of operations numbered 639,647, or 40,400 more than in 1907-08. The increase is accounted for partly by the inclusion of 14,740 operations performed in three Feudatory States from which no return was received last year, and partly by the excellence of the work done in the districts of Jubbulpore, Yeotmal, Akola, Buldana, Saugor and Nimar. Of the total, 553,438 were primary cases and 86,209 revaccinations, compared with 524,599 and 74,648, respectively, in the previous year. The percentage of success was 98·78 against 98·41 in primary cases and 75·66 against 76·36 in revaccinations.

Taking the three agencies—Khalsa, Dispensaries and Feudatory States separately, the details were as follow—

Khalsa—Of the total of 537,941 operations, 462,134 were primary vaccinations and 75,807 revaccinations, compared with a total of 511,603, and 444,773 and 66,830 primary operations and revaccinations, respectively, in the preceding year. In primary cases the ratio of success was 99·10 against 98·75 per cent and in revaccinations 74·99 against 76·12 per cent. Of the 22 districts no less than 16 contributed towards the increase, among them were Mandla (6,029), Jubbulpore (4,399), Akola (4,336), Buldana (4,046) and Yeotmal (3,767). Of the six districts in which a decrease occurred, the largest fall was in Bilaspur (4,383), followed by Nagpur (3,099) and Wardha (2,666). The cause of the decrease is attributed mainly to bad work by vaccinators.

Dispensaries.—Including the institutions in the Feudatory States the vaccination operations at dispensaries consisted of 22,199 primary cases and 3,376 revaccinations, compared with 20,964 and 3,060, respectively, in 1907-08, and the percentages of success in the two classes of work were 97·40 and 59·09, respectively, in 1908-09 against 95·77 and 69·98 in 1907-08.

Feudatory States.—There was a total of 76,131 operations made up of 69,105 primary cases and 7,026 revaccinations, against a total of 63,620 in 1907-08,

of which 58,862 were primary cases and 4,758 revaccinations. The increase is due to the submission of returns from three States from which they were not received in the preceding year. The percentage of success in primary work was 94·08 and in revaccinations 89·20, against rates of 96·78 and 83·07, respectively, in 1907-08.

On an estimated birth rate of 40 per thousand for the whole province, including States, 76·98 per cent of the children were successfully vaccinated compared with 73·46 per cent in the preceding year. In the municipal towns of the province 91·70 per cent. of the children calculated to be available were protected, against 91·88 per cent the year before.

Glycerinated lymph was used in the vast majority of the vaccination operations; lanolinated lymph and fresh calf lymph were also used, but to a limited extent. The percentages of success by the three methods were 93·11, 76·41 and 99·36, respectively. The arm-to-arm method is still occasionally practised in the Chanda, Raipur, Drug and Buldana districts, but the hope is expressed that it will be possible to discontinue it.

The total cost of the department was £4,832 of which £4,400 were spent in British territory and £433 in the States, as compared with £4,195 and £334, respectively, in the previous year, while the cost of each successful case was 2*d.* in British territory in both years and in the States $1\frac{1}{4}d.$ in 1908-09 and $1\frac{5}{12}d.$ in 1907-08.

Madras.

The total number of vaccination operations in the Presidency rose from 1,627,848 in 1907-08 to 1,649,405 in 1908-09, showing an increase of 21,557 cases. The increase was neither so great nor as satisfactory as in the previous year when it occurred in both classes of work. Of the total operations in 1908-09, primary cases numbered 1,478,771 or 24,597 less than in 1907-08, and revaccinations 170,634 or 46,154 more, giving a net increase of 21,557. Among the districts the largest increase occurred in Vizagapatam (30,604), followed by Chingleput (9,632), Godavari (8,047) and Salem (5,283), attributed mainly to the prevalence of small-pox. The largest decreases occurred in Madura (5,806), Kistna (5,328), Trichinopoly (4,675), Kurnool (3,890) and Ganjam (3,653), in all of which, except Trichinopoly, the decline is ascribed wholly or in part to the absence of vaccinators on leave without substitutes being provided, and in Trichinopoly to the reduction of the vaccinators' minimum outturn of work and to there being less small-pox. The percentage of success in primary cases was practically the same in both 1908-09 and 1907-08, *viz.*, 95·5 and 95·6, respectively, but in revaccinations the rate was 81·4 to which it rose from 76·6 the year before. There was again a decline in the number of vaccinations performed in municipalities, the number falling to 143,267 from 150,906 in 1907-08; among the towns showing a decrease was Madras (4,194), Calicut (2,453), Cannanore (1,563) and Madura (1,086). In Madras the fall was due to a smaller number of vaccinations having been performed at the Natal and Mauritius emigration depôts and at the Penitentiary, and elsewhere to one or more of the following causes—prevalence of plague and cholera, decreased birth rate and the non-entertainment of temporary vaccinators. The steady fall in dispensary vaccination

explained in the preceding reports, continued, the number of operations falling from 158 in 1907-08 to 55 in 1908-09.

On an estimated birth rate of 40 per thousand, 40·98 per cent of the children against 36·98 per cent in the previous year, were successfully vaccinated, and in municipalities the rate was 68·7 per cent in 1908-09 compared with 67·3 per cent the year before.

Lanoline lymph supplied by the King Institute was chiefly employed; in Local Fund areas it was employed exclusively with a percentage of success of 95·3; in municipalities the rate of success was 96·6 per cent with lanoline lymph, while with glycerine lymph it was 99·7 per cent and with calf lymph, prepared locally, the rate of success was as high as 99·9 per cent.

Lymph was issued throughout the year from the King Institute and unless glycerine lymph was asked for, lanoline lymph was supplied. The Superintendent of the Institute points out that the glycerine lymph is much more sensitive to high temperatures than lanoline lymph and should therefore be used as soon as possible after receipt. The Superintendent also mentions that, as it has now been abundantly proved that vaccine kept at approximately freezing point will retain its potency for at least six months, advantage will be taken of the fact to prepare vaccine only under the most favourable climatic conditions. The Superintendent's warning as to the necessity, owing to the risk of deterioration, of vaccinators using vaccine within a fortnight of the date of its issue from the Institute, has been impressed on the local authorities.

The cost of the department increased from £19,947 in 1907-08 to £21,450 in 1908-09, and the cost of each successful case from $3\frac{1}{4}d.$ to $3\frac{5}{12}d.$

Coorg.

In this small province the total vaccination operations fell from 11,150 in 1907-08 to 10,482 in 1908-09. The primary cases numbered 8,509 and revaccinations 1,973, or 31 and 637 fewer, respectively, than in the year before. Included in these figures are 232 operations performed at dispensaries compared with 246 in 1907-08. The decrease is attributed to the prevalence of small-pox in the previous year in the Mercara municipality and the Padilknad and Yedilknad *taluks* when more vaccination work was the result. The percentage of success was lower in 1908-09 than in 1907-08, the respective rates being 92·41 and 93·52 in primary cases, and 75·05 and 79·19 in revaccinations.

On an estimated birth rate of 40 per thousand, 12·15 per cent of the children were successfully vaccinated against 10·44 per cent the year before. In municipalities 172 children were calculated to be available, but 193 were successfully vaccinated, which suggests that children from outside were brought in and vaccinated.

The cost of the department rose from £185 in 1907-08 to £187 and the cost of each successful case from $4\frac{3}{5}d.$ to $5d.$

Bombay.

During the year 1908-09, the total number of primary vaccinations numbered 673,347 against 596,663 in 1907-08, and the revaccinations 52,425 against 40,985, showing a total increase of 88,124 operations. This is satisfactory when compared with the

results of 1905-06 and 1906-07 in both of which years there was a fall, and in 1907-08 when the recovery was to the extent of a total increase of 7,653 operations only. All the districts contributed to the increase in primary cases and in two only, the Southern and Sind Registration districts, were the revaccinations less numerous than in the preceding year. The percentage of success in primary operations was 96·02 or a little below the rate of 96·78 in 1907-08, but the rate in revaccinations fell to 70·65 from 76·86. In the above is included the work done at dispensaries. At these institutions 624 primary operations were performed compared with 730 the year before, the ratios of success being 95·65 and 96·71 per cent, respectively, while revaccinations numbered 1,073 against 850 with ratios of success of 78·94 and 19·10 per cent.

On an estimated birth rate of 40 per thousand, 54·86 per cent of the children were successfully vaccinated, or 4·66 per cent more than in the previous year. As in previous years, the number of children successfully vaccinated in certain municipal towns exceeded the number available owing to the former number being augmented by the influx of children from outside who are necessarily not reckoned among the births.

The buildings for the vaccine depôt at Belgaum under construction at the close of the year, were expected to be completed by the commencement of the next vaccinating season when the use of preserved lymph will be extended to the whole Presidency including Sind. With the lymph issued to vaccinators the case and insertion success were at the rates of 97·72 and 94·78 per cent respectively; excluding the operations in the hot months of April and May the rate of success approached 100 per cent. The introduction of cold storage is expected to overcome the climatic disadvantage which is experienced at present.

Glycerinated lymph was chiefly used, but in all registration districts except the Presidency, human lymph was also employed, to the largest extent in the Sind Registration district. Animal lymph was used in four of the six registration districts, but in one of the four, the Central district, only to a small extent.

The cost of the department rose from £19,596 in 1907-08 to £21,825, the explanation being the increased pay of Deputy Sanitary Commissioners, the grant of grain compensation allowance to staff, and to the entertainment of additional vaccinators. The cost of the Belgaum Vaccine depôt increased from £966 to £1,535 and this is stated to be due to the inclusion of expenditure of the previous year, to certain capital expenditure on apparatus and to a severe and fatal epidemic among the calves. The cost of each successful case was $8\frac{5}{12}d.$ or $\frac{1}{12}d.$ less than in the year before.

Burma.

In 1907-08 there had been a fall of 23,119 vaccinations in Burma compared with the preceding year, and in 1908-09, with a total of 396,413 there was a further fall of 10,120 operations. Of this total, 342,977, or 7,998 fewer than in 1907-08, were primary cases and 53,436, or 2,122 fewer, were revaccinations. Primary work was successful at the rate of 93 59 per cent, showing an improvement on the rate of 91·86 per cent in the previous year, and in revaccinations also there was an improvement, the rates being 59·99 and 58·97 per cent, respectively, in the two years. Although, then, in the past two years the amount of vaccination work has declined,

its quality has improved. Excluding the vaccinations at dispensaries, 14 districts show an increase in the number of operations, the largest increases being in the Southern Shan States (8,353), Kyaukpyu (3,461) and Shwebo (2,000). In four other districts there was an increase of over 1,000 cases. In 26 districts there was a decrease, the largest being 3,933 in Akyab, 3,101 in Upper Chindwin, 2,571 in Meiktila and 2,198 in Myingyan. Various reasons are assigned for the falling off that occurred, such as epidemics of plague and cholera in some districts, the absence of small-pox in others, emigration of the people from tracts affected by scarcity, inefficiency among or absence of the vaccinating staff, and passive opposition to vaccination on the part of people who favour inoculation. The provincial Sanitary Commissioner agrees that the explanations are reasonable in some, but not in all cases, for instance, severe plague and cholera epidemics in Tharrawaddy did not prevent the increase of vaccination work in that district. In the work done at dispensaries there was a falling off of 5,044 operations and also in the percentage of success in primary cases, from 95·32 in 1907-08 to 94·24 in 1908-09, though in revaccinations the rate rose from 60·18 to 64·25 per cent. It is assumed that the reasons for the falling off in vaccination work in the districts apply also to the work at dispensaries, though this is the first check in the steady increase hitherto recorded at the latter.

On an estimated birth rate of 40 per thousand, 21·07 per cent of the children were successfully vaccinated compared with 19·71 per cent in 1907-08. In towns it was again the case that a larger number of children were successfully vaccinated than were estimated to be available; evidently children not included in the births of the town were brought in and vaccinated.

The vaccine depôt at Meiktila continued to supply vaccine to the entire province, excepting the Rangoon municipality, the greater part of the issues being of glycerinated lymph; lanoline and quinated vaccine were also issued, but the latter only to a limited extent. The Superintendent of the depôt complained that there had been an unnecessary wastage of vaccine for which, however, in some instances there is a reasonable excuse owing to subjects for vaccination not being readily available; in other cases it is said that the backward state of vaccination is the reason for the wasteful use of vaccine. The best results were obtained with glycerinated lymph. The provincial Sanitary Commissioner pays a high tribute of praise to the late Superintendent of the depôt, Major Entrican, I.M.S., for the perfection to which he brought the manufacture of vaccine during his incumbency of the appointment of Superintendent.

The vaccine supplied by the Rangoon Municipal vaccine depôt was of excellent quality throughout the year; the percentage of success obtained with it in primary cases was 98·95. The new buildings for the depôt are now ready for occupation.

Inoculation is still practised in some districts, especially of the Arakan, Irrawaddy and Pegu divisions, and it is in those districts that vaccination is backward, the people maintaining a hostile attitude towards it. Under an Act passed during the year inoculation becomes a criminal offence in places where the new law is applied, and this is to be done as a commencement in the Hanthawaddy and Pegu districts. An Act to make compulsory the vaccination of labourers arriving at Rangoon who are unprotected from small-pox has also recently been passed; under this law the Municipal Committee of Rangoon is

given additional powers to secure the vaccination of the occupants of lodging houses and factories.

The cost of the department rose from £9,240 in 1907-08 to £9,990 in 1908-09, the increase being due to the entertainment of additional establishment and greater expenditure on account of travelling. The cost of each successful case was $7\frac{5}{12}d.$ or $\frac{1}{2}d.$ more than in the previous year.

Ajmer-Merwara.

The total number of vaccination operations in Ajmer-Merwara during 1908-09 was 12,801 of which 12,497 were primary cases and 304 revaccinations. Compared with the preceding year there was a decrease of 1,774 in the total—1,383 fewer primary cases and 391 fewer revaccinations. The percentage of success in primary operations was 97·48 which is slightly below the rate of 97·94 in the previous year, but in revaccinations the rate was 92·11 per cent, to which it rose from 67·19 in 1907-08. No vaccination was done at dispensaries.

On an estimated birth rate of 40 per thousand of the population, 52·90 per cent of the infants were successfully vaccinated as compared with 54·81 per cent during 1907-08.

The cost of the department, which had risen to £202 in 1907-08, fell to £198 in 1908-09, but each successful case cost $3\frac{5}{8}d.$ against $3\frac{5}{12}d.$ the year before.

Sanitary Works.

Bengal.

Excluding Calcutta, the number of municipalities in Bengal in 1907-08 was 127, the municipality of Uluberia having been abolished during the year. The aggregate income, including the opening balances, was £453,087, of which 39·51 per cent was spent on original or recurring sanitary works (against 43·15 per cent in the previous year), 9·18 per cent on roads (against 7·24), 4·36 per cent on the public safety (against 5·04), and 27·81 per cent on other requirements (against 27·59). The actual sums expended under the main heads were £89,359 on conservancy, including the pay of establishments, road watering, etc.; £22,641 on water supply; and £17,921 on drainage. An increase of about £6,333 on conservancy as compared with the previous year seems to have been generally distributed, while a decrease of about £5,200 on drainage was due to a reduction in the exceptional expenditure at Howrah. The provincial Sanitary Commissioner states that the results of the efforts of past years to improve the health conditions of the towns is very perceptible; but the local Government points out that the rate of progress is slow in comparison with what there is to be done. Delays are due largely to want of funds, but time and money also are wasted by defective preliminary work on projects and the Sanitary Board have been instructed to examine this question with a view to ensuring efficient supervision and, if necessary, affording expert assistance at the early stages of schemes.

Much attention was paid to the working of septic tanks, particularly the important ones installed by the mills on the banks of the Hooghly, and an Inspector was appointed for the purpose of ensuring their efficient working.

Sanitary Board.

The Sanitary Board met five times during the year. The principal subjects of discussion at these meetings were (1) the improvement of sanitary administration; (2) the supervision of the preparation of municipal drainage schemes in the Presidency Division; (3) the construction of a drainage scheme for the Baranagar Municipality; and (4) the pay and emoluments of the office of Assistant Sanitary Engineer.

Preliminary estimates were prepared for (1) water supply works for Hooghly-Chinsurah, where it is proposed to lift water from the Hooghly into settling tanks, thence it is to pass through filters into a clear water reservoir from which it will be pumped into two service reservoirs. The scheme, which is to supply eight gallons a head daily to a population of 25,000, is estimated to cost £24,667; (2) Daltongunge water works—this is a reconstruction scheme rendered necessary owing to the failure of the existing well to furnish the increased supply of water necessary.

A detailed estimate was prepared for water works at Gaya (town population 71,416), where it is proposed to sink three wells from which water will be

pumped to two service reservoirs for the supply of the town. The estimated supply is 13 gallons a head and the cost £43,512.

The following schemes were considered :—

(1) Bûrdwan drainage scheme.

(2) Khulna drainage project.

(3) Serampore drainage scheme.

(4) Arrah drainage scheme.

(5) The Northern and Southern foreshore sections of the Howrah drainage system.

(6) The Darjeeling sewage scheme.

(7) Puri water works. The water is to be pumped from five wells in the vicinity of the railway station to a service reservoir on the Markunda road. Initial cost £19,812. Work on one well had been begun.

(8) Murshidabad water works. Supply 120,000 gallons filtered water a day ; initial cost £10,000; cost of maintenance £467 a year.

During the year a B. E. student satisfactorily completed his practical training in sanitary engineering and obtained a certificate. Three other B E students have availed themselves of the scholarships this year and are working under the Sanitary Engineer of the province.

By a notification, dated the 6th May 1908, the local Government ordered the reconstitution of the Sanitary Board as follows :—

A member of the Board of Revenue	...	President.
The Chief Engineer, Irrigation Department	...	Members.
„ „ Buildings and Roads Branch Public Works Department	... ...	
The Sanitary Commissioner	... ...	
The Sanitary Engineer	... ...	Secretary.

Eastern Bengal and Assam.

The total income of the 44 municipalities, two stations and four unions in 1908, including opening balances, was £128,747, of which 47·94 per cent was spent on sanitation, compared with 47·04 per cent of £125,247 in 1907. Under the main heads of expenditure, £36,136 were spent on conservancy, including establishment, road watering, etc., £10,343 on water supply, and £2,604 on drainage.

The principal schemes in progress are the following :—

At Dacca the conservancy scheme for the removal of night soil from central depôts by means of tramways to a trenching ground at a distance of five miles from the city has been practically completed at a cost of about £20,000.

Schemes for improving the water supply of the station at a cost of £33,333 and for the surface drainage of the civil station at a cost of £12,085 are being considered.

A large reclamation, drainage, and also a sewage scheme, to cost from £133,333 to £166,667 are being considered.

At Chittagong artesian borings having proved successful, two 6" wells are being sunk from which it is hoped a water supply will be obtained.

At Narayanganj the water supply works were completed and are giving satisfaction.

At Mymensingh improvements in the water supply and a drainage scheme are under consideration.

At Rampur Boalia and Nator experimental borings for water have been made.

At Rangpur a drainage scheme is under consideration; and at English Bazar work on a scheme has been begun.

At Imphal, the capital of Manipur, and at Haflong, in the North Cachar Hills, water supply schemes are being carried out; and at Shillong and Gauhati improvements in the water supply are contemplated.

Drainage schemes are being drawn up for Gauhati, Dibrugarh, Golaghat, and Silchar, and schemes for the water supply and drainage of Barisal, Nator, Faridpur and Chandpur are under consideration.

Expenditure to the extent of £11,498 was incurred by district and local boards, £7,413 was spent by private individuals, and £3,933 was given as grants-in-aid by the Sanitary Board—most of this money was devoted to improving rural water supplies.

Sanitary Board.

Many of the subjects which were considered by the Board have been noted above. Besides those the Board considered and reported upon the Government of India's proposals regarding the formation of a provincial sanitary service, the revision of the constitution, functions and powers of the Sanitary Board, and an increase in the number of Deputy Sanitary Commissioners.

A scheme was drawn up for the purpose of effecting the improvement of the supplies of water in the Gauhati sub-division of the Kamrup district, which were seriously injured by the earthquake of 1897. The scheme is estimated to cost £2,000 annually for five years. A similar scheme on a smaller scale has been drawn up by the Barpeta Local Board.

The Board were given authority to relax, in cases of necessity, the conditions in respect of local contributions under which grants-in-aid for the improvement of water supplies are distributed, and demands for money have consequently increased.

United Provinces.

"Activity in sanitary matters," it is noted by the provincial Sanitary Commissioner, "was a prominent feature of the year," but this, so far as concerns the municipalities, was almost limited to the extension of

existing works and progress with those already in course of construction, for the total cost of the projects approved by the Sanitary Board was only £11,121. During 1907-08 the municipalities spent 54 per cent of their income on conservancy, plague measures, water supply and drainage, but this includes capital charges which were very high in Mussoorie and Almora. The expenditure on water supply in the eight towns with large installations was £71,573; on drainage works the total expenditure was £40,234.

Improvements were effected in the water supply at Benares, and progress was made with the Mussoorie hydro-electric scheme. A scheme for improving the pumping plant at Cawnpore at a cost of £40,000 was under consideration. At Allahabad a scheme for an unfiltered water supply to cost £25,553 was submitted. Extension of the Agra water works was discussed; and means to improve the Naini Tal supply were investigated.

The Moradabad drainage project to cost £32,097 was completed and sanctioned and work was started in January 1909. The drainage of Hathras (£12,270) was completed. The revised project for Jaunpur (£31,067) was completed and sanctioned, and work was commenced on a portion of the project, to cost £10,000, which is all the municipality could finance.

Six other projects, costing in the aggregate £75,002, were sanctioned and several others still await sanction. Four projects, including the Allahabad drainage works (£113,333), to cost in all £194,448, were prepared by Mr. Lane Brown, but it is stated that these require revision.

Thirteen other municipalities have applied for drainage schemes.

The sullage farm at Agra was reported on by a special committee, which found that it was not injurious to the health of those residing in its neighbourhood and that, if properly worked, it should cause no nuisance.

Sanitary Board.

The Sanitary Board met three times during the year. The most important matter considered by them was a letter from the Government of India regarding a scheme for improving the sanitary services.

Punjab.

Excluding opening balances, the total revenue of the municipalities in 1907-08 was £405,069, and of this £196,619, or 48·54 per cent, was spent on public health and convenience, including £34,413 on water supplies, £16,713 on drainage, and £49,071 on conservancy, road cleaning, watering, and latrines.

The following notes refer to the principal works of sanitary improvement undertaken or about to be undertaken in the province. At Lahore the twelve new wells in extension of the existing trench wells at the head works of the Lahore water supply were almost completed at a cost of £5,200. At Simla the hydro-electric scheme to utilise the water power of the Sutlej at Nauti Khud to increase the water supply and light the station was approved by the Government of India, and near the end of the year a special Public Works Division was opened for the purpose of preparing a fair project and carrying out the work. At

Ludhiana the water works scheme (£28,698) was nearly completed, and the works were handed over to the municipality. At Amritsar the work of intramural drainage was begun. At Delhi the intramural drainage works were finished and handed over to the Municipal Committee; and the suburban drainage project, to cost £25,267, was begun. Five minor works, including drainage at Jhelum and Hazro, and water supply to the Remount Depôt at Sargodha were completed during the year. There were in progress of construction nine schemes including water supply and drainage of Campbellpur and Pind Dadan Khan, and drainage of Bahlwal (£3,341), Sangla (£2,516) and Majitha (£528). A number of other estimates, the most important of which was for the drainage of Chiniot (£3,933, sanctioned) were prepared.

Sanitary Board.

The Sanitary Board met three times during the year and discussed the various schemes of municipal improvement brought before them. They allotted from the £6,667 placed at their disposal by Government, sums to various towns in aid of drainage schemes. They considered the proposals of the Government of India for improving the sanitary services, and offered certain suggestions to the local Government.

North-West Frontier Province.

No new sanitary work of any magnitude was carried out during the year; but owing to handsome grants received from Government, the municipalities of Peshawar and Dera Ismail Khan were able to entertain an Assistant Surgeon each as assistant health officer, whose supervision has effected considerable improvement in the sanitation of those towns. The administrative medical officer has a special word of praise for the management of sanitary matters at Kohat which has been fortunate in securing as honorary secretary an Indian gentleman who understands and takes a lively interest in sanitary administration.

Central Provinces and Berar.

The following were among the works carried out by the Public Works Department during the year. The extension of the catchment area of the Kalapani tank at Amraoti at a cost of £8,533. In connection with the Jubbulpore water works extension, the dam of the reservoir was raised by three feet nine inches, a length of five miles of 24″ main was laid and the distribution system was extended. At Khandwa the flood escape and regulator on the Ajanti feeder channel were completed. At Badnera the drains are completed, and at Jubbulpore the construction of side drains from the Nanhai Phatak to the main outfall drain commenced in 1907 was completed. Excluding opening balances, etc., the income of the head-quarters' municipalities rose from £90,040 in the previous year to £93,994, and the percentage spent on sanitation from 42·72 to 59·47.

The provisions of the Village Sanitation Act were applied to two villages in the Chanda district. They were not withdrawn from any village.

Sanitary Board.

The Sanitary Board met at fourteen head-quarter towns. The work done under their auspices was mainly in connection with the improvement of village sites and water supplies.

Madras.

In the absence of information as to income and expenditure, the following has been extracted from the General Municipal Review of District Municipalities in the Presidency for 1907-08. Excluding the opening balance of £78,539 the total income of the year amounted to £270,137, against £260,310 in the previous year. Under the head "Public Health and Convenience" the expenditure on water supply was—the figures in brackets are for the previous year, capital outlay £10,545 (£7,333), establishment, etc., £12,095 (£12,273); Drainage, capital outlay £2,391 (£4,476), establishment, etc., £2,558; conservancy, including roads and plague, £61,216 (£62,527). The allotment for sanitation by District Boards was £69,038 against £55,025 in the previous year.

The provincial Sanitary Commissioner points out that sanitary progress in most *mofassal* municipalities is rather slow; in many cases this is due to want of money, but in others the councils do not display any great ability in the management of their affairs and do not receive anything like the full value of the money expended. Lack of interest on the part of the municipal councils leads to neglect of their work by sanitary inspectors, while the practice of employing those officials to carry out duties other than those proper to their office, although contrary to the orders of Government, is in force in many municipalities and greatly detracts from the quality of the sanitary work done.

The number of districts administered under the Madras Local Boards Act was 23, and £69,038 were allotted for sanitary purposes, but less than half was spent during the first nine months of the year.

The following major works were being carried out by the Public Works Department during the year: Berhampur water supply (cost, £20,733), Bezwada water supply (£20,786), Salem water supply (£54,036), Periyakulam water supply (£10,845), Gudiyattam water supply extension (£1,467), the building of a service reservoir at Trichinopoly (£4,220). The execution of the Ootacamund drainage works (£25,707) and of the Cocanada water works improvements (£2,917) was transferred to the Public Works Department.

The Sanitary Engineer carried out the following: Cuddapah water works improvements—the new gallery was excavated, but owing to slips, work was stopped pending further investigations. At Kumbakonum boring was carried to a depth of 311 feet, and the yield of water proving satisfactory, arrangements were made to obtain a temporary supply for the Mahamakam festival. At Kodambakkam an experimental well, ten feet in diameter, was completed, but the supply of water was unsatisfactory. At Saidapet arrangements were made to acquire land outside cantonment limits for the head works of the water supply.

The investigation of fifteen schemes was approved by Government, namely, water supplies for Vaniyambadi, Rajahmundry, Mangalore, Palamcottah, Ellore, Ongole and Negapatam, and the drainage of Mangalore, Negapatam, Anakapalle, Cuncut, Vellore, Rajahmundry, Srirangam and Nellore.

Sanitary Board.

During the year the Board examined schemes estimated to cost in the aggregate £48,596, the most important being the following:—the water supply of Masulipatam at

a cost of £20,793, and the extension of the Ootacamund drainage works at a cost of £3,200.

Bombay.

Excluding Bombay City, there were in 1908 in the presidency 158 municipal towns, of which the aggregate net income was £532,833. The amount spent on improving water supply, on drainage and on conservancy within municipal limits was £115,718. There were 25 District Local Boards and 211 *tāluka* Local Boards, with a total income of £427,070, of which £25,028 were expended upon water supplies and drainage.

The Bombay Village Sanitation Act was in force in 265 villages. The success of the Act appears to vary in different parts of the province; in the Western and Central Registration Districts some good has resulted, but in Gujarat and Sind the Deputy Sanitary Commissioners do not think villages in which the Act is in force show any improvement over other villages.

The following were the more important works in progress during the year:—

Pandharpur water supply. A project to pump water from wells in the bed of the river Bhima, a mile above the town, into a service reservoir whence the water will be distributed by gravitation, was sanctioned by Government who provided £13,333; work was begun at the end of the year. The drainage works were continued. At Dhulia the filter beds were completed at a cost of £2,128. At Ahmedabad it has been found necessary to provide for new wells and additional machinery at the head works of the water supply. Progress was made during the year in connecting the densely populated portion of the city with the sewerage system. At Karachi the water supply distribution was improved, and the Shone sewerage system extended. At Hyderabad a scheme was prepared by the municipality for connecting the two outfalls and the disposal of the sewage and £3,333 was allotted, but, pending some changes in the scheme, work was not begun. Land was purchased for a sewage farm. At Surat £2,568 were expended on the installation of new engines for the water works.

Water supply works for Dharwar and Hubli were sanctioned, but work was not commenced; and the following projects were in preparation:—water supplies for Nasik, Ahmednagar, Hyderabad (improvement), Sukkur, Bijapur, Broach, Bulsar, Dholka, Godhra, Thana and Viramgaon, and a complete project for the drainage of Bhusaval.

Sanitary Board.

The Board held three meetings during the year at which they dealt, among other matters, with schemes for improvements to the Pandharpur water supply and for providing water supplies to Dharwar, Nasik and Hubli, and also considered questions in connection with water supplies for certain towns.

Burma.

Excluding Rangoon, the income of the municipal towns in Burma amounted in 1908 to £222,238 and the total expenditure on sanitary works was £85,623, or 38·53 per cent. of the income. The income of the non-municipal towns is not stated, but they spent 45·18 per cent. of it on sanitary works. The proportion of District Funds and District Cess Funds devoted to sanitation was 7·88 per cent. The local Government made considerable contributions to certain schemes, including a

grant of £3,467 to Mandalay for the purpose of regrading the channel of the Shwetachaung Canal, £ 3,333 to Mandalay and a like sum to Prome for the improvement of congested areas. A number of projects were either in process of completion of completed and awaiting sanction, including water supply schemes for Mandalay, Bassein, Monywa, Minbu and Tavoy, conservancy schemes for Minbu, Danubyu, Kyaiklat, Pyapon and Wakema, and a sewage scheme for Rangoon Cantonment. The water supply scheme for Pegu and the drainage scheme for Moulmein were examined and reports upon them submitted.

Sanitary Board.

The Sanitary Board met once during the year and considered the drainage and conservancy schemes for Kyaiklat. They also considered letters from the local Government regarding the improvement of the sanitary services in India and the functions of the provincial Sanitary Board, and furnished the local Government with their opinions regarding the constitution and functions of the provincial Sanitary Board.

General Remarks.

Red Sea Pilgrim Traffic.

The orders promulgated by the Government of India at the end of September 1906, which were detailed in this report for 1905, have annually been notified as the terms on which pilgrimage to the Haj is permitted. In a notification dated the 13th July 1908, the orders were repeated with the intimation that they will continue in force till further notice.

For the pilgrim season 1907-08, all pilgrim ships were thoroughly cleansed and freed from rats by the Clayton process under the personal direction of the Port Health Officer, Bombay, and the pilgrims themselves were subjected to medical inspection, their clothing and bedding being thoroughly disinfected before embarkation. In the reports of the Port Health Officer, of the Protector of Pilgrims, Bombay, and the report on the Camaran Lazaret, it is stated that 25 ships conveyed the pilgrims from Bombay, but the three reports differ as to the actual number of pilgrims who undertook the Haj, the numbers being 21,867, 21,766 (including 219 infants) and 21,813, respectively. It is said that some of the 21,813 pilgrims mentioned in the Camaran report were embarked at Aden. All the ships were medically inspected at Perim, but it was not found necessary to land any pilgrims for detention at the observation camp. During the voyage 87 deaths occurred among the Indian pilgrims, the increase being attributed to a greater number than usual of poor, old and debilitated persons undertaking the Haj. During the period of detention at Camaran, 63 out of 102 deaths occurred among pilgrims from India. Cholera appeared at Camaran among the pilgrims carried by the "Islami" which left Bombay on the 31st October and arrived at Camaran on the 12th November 1907, and also among those carried by the "Zamania," which left Bombay on the 18th and arrived at Camaran on the 27th November 1907. These outbreaks and their bearing on cholera in the Hejaz are described in a subsequent paragraph.

The accommodation for the segregation of pilgrims at Camaran is said to have been inadequate and its extension at an early date is recommended. The period of quarantine for pilgrims from the east has been reduced from five to three days, but for Indian pilgrims it has been reduced only from ten to eight days, including one day for disinfection, debarkation, etc.

The Haj report for 1907-08 records that cholera was present in Mecca before pilgrims from the cholera-stricken steamer "Islami" were landed at Jeddah, and that both towns were in a deplorably dirty condition at the time of the pilgrimage; that no steps were taken to protect the water supply of "Ain-Zubeida" from contamination; and that the hospital arrangements at Mina, Mecca and Jeddah were inadequate for cholera patients. It is estimated that of a total of 140,000 pilgrims, 21,000 died of cholera in the Hejaz in a period of four months. It is said that great hostility is being shown by the Bedouins to the Hejaz railway and that the roads were unsafe owing to their depredations. Camel hire has risen enormously, from Rs. 50 to Rs. 150 for a camel, in the last fifteen years. About 700 destitute pilgrims were repatriated from Jeddah by charity.

The Indian pilgrims returned to Bombay in 24 ships which brought in all 18,351 pilgrims. On the homeward voyage 340 deaths occurred, due chiefly to old age, general debility, privation, pneumonia, dysentery and diarrhœa. Eighteen ships had among them during the voyage, 7 cases of plague, two of cholera, 156 of small-pox, two of chicken-pox and one of measles. Of the small-pox patients, 50 were landed at Aden, one at Muculla, 13 died on the voyage and 92 were landed at Bombay and sent to hospital. Vaccination was offered to the pilgrims among whom small-pox occurred, but was refused by all. One patient suffering from plague and two patients suffering from cholera were landed at Aden; and the ships on which cases of plague occurred were thoroughly fumigated by means of the Clayton process. The clothing and bedding of 14,599 pilgrims among whom infectious diseases occurred were disinfected, after which those pilgrims were taken over by the Protector of Pilgrims for despatch to their homes. The effects of 1,660 crew of the infected ships were also disinfected.

Cholera in the Hejaz.

In November 1907, seven cases of illness, diagnosed as cholera, occurred at Camaran among the pilgrims of two pilgrim ships from Bombay; and towards the end of the year the Hejaz was infected with cholera and a severe outbreak attended by a heavy mortality ensued.

The occurrence of cholera at Camaran and in the Hejaz in 1907 is of peculiar interest, because the circumstances of the cases at Camaran appear to throw additional light upon the epidemiology of cholera, and because it has been stated on the one hand, that the Hejaz was infected in 1907 by Indian pilgrims, and on the other, that the freedom from cholera in recent years of Camaran and the Hejaz has been due to the detention of Indian pilgrims in the plague observation camp at Bombay. The several accounts of the infection of the Hejaz do not agree with each other, and it is not easy to get at the facts; but the narrative of events at Camaran is fairly clear, although there is room for difference of opinion regarding their interpretation.

The pilgrim ship "Islami" with 826 pilgrims on board sailed from Bombay on the 31st October and arrived at Camaran on the 12th November. Between the 15th and 20th November three cases of cholera occurred among her pilgrims in the lazaretto.

The pilgrim ship "Zamania" left Bombay with 1,221 pilgrims on the 18th November and arrived at Camaran on the 27th. The pilgrims were disembarked and placed in the lazaretto apart from the "Islami's" pilgrims. Between the 29th November and the 12th December four cases of cholera occurred among the "Zamania's" pilgrims.

In the case of the "Islami," then, the first case of cholera occurred at least fifteen days after the vessel left Bombay, and in the case of the "Zamania," eleven days elapsed between the departure from Bombay and the occurrence of the first case of cholera.*

Dr. Delpino, the Director of the quarantine station at Camaran, suggests that it is possible that one or two cases of cholera occurred on board the "Islami" during the voyage from Bombay to Camaran, but he is sure that no case of cholera occurred on board the "Zamania," and that the "Zamania's" pilgrims were not infected by the "Islami's" pilgrims.

* An account of similar outbreaks will be found in this Report for 1895.

Both vessels were apparently healthy when inspected at Aden and Perim, and the evidence seems to be against the occurrence of cholera on either of them.

The water-supplies of both vessels were examined bacteriologically at Camaran. A harmless vibrio was isolated from the water of the "Islami," but no vibrio was found in the water of the "Zamania" which was repeatedly examined. The diagnosis of cholera in those attacked was established bacteriologically and the problem was "where did they become infected?" Excluding the ships and Camaran, Dr. Delpino believed that the germs of cholera were brought from India in the intestines of the pilgrims themselves, and he attributed the cholera at Camaran to a *microbisme latent*. Everyone is familiar with the fact, first pointed out in 1893,* and now a commonplace of the text books, that in times of cholera epidemics a considerable proportion of the people exposed to infection carry in their intestines the germs of cholera without manifesting any sign of the disease. These people are temporarily or permanently immune, and it is a generally accepted belief that when the germs carried by them reach a susceptible host they give rise to cholera which then spreads from the second host in the ordinary way. Dr. Delpino appears to be of the opinion that the vibrios carried by the Indian pilgrims were not virulent, and that for some reason they became virulent at Camaran and caused attacks of cholera *in the carriers themselves*. Apart from the circumstances of the cases among the "Zamania's" pilgrims especially, he was supported in the belief by the discovery of the true vibrios of cholera in the stools of two Bokharan pilgrims from the "Islami" who were in hospital on account of intestinal catarrh and dysentery, respectively, and in the stools of an Indian pilgrim from the "Zamania," who was in hospital suffering from slight catarrhal dysentery. None of these three pilgrims showed any sign of cholera. It is true that cholera vibrios were not found in the stools of those attacked before their attack, but such a discovery has been made elsewhere. Professor W. Kolle found cholera vibrios in the apparently normal dejections of two members of a family, in which a case of cholera had occurred. The two cholera carriers were removed to a hospital where infection was out of the question, and several days afterwards developed a fairly severe and slight attack of cholera, respectively.†

Immunity and virulence are, of course, relative terms, but it would appear that "cholera carriers" range between two extreme conditions, those whose escape is due to immunity owing to an idiosyncrasy that protects them against a virulent microbe, and those who, although susceptible, escape because the microbes harboured by them are not virulent. The first class are a danger to the community in which they live so long as they continue to excrete virulent microbes, the second class do not become dangerous until some cause—whether specific or not—confers virulency on the microbes they are carrying.

The "Islami" was detained at Camaran until the 19th December, after which she left for Abou Saad where fresh cases of cholera are said to have appeared. Her pilgrims landed at Jeddah on the 21st December and the "Zamania's" pilgrims landed there the same day.

*Professor Günther in his *Einführung*, 6th edition, page 649, quotes papers by Canon, Lazarus, and Pielicke, *Berl. klin. Wochenschrift*, 1892, page 1216; and by Rumpel, *Deutsche med. Wochenschrift*, 1893, No. 7. See also R. Koch, *Zeitschrift f. Hyg.* Bd. 14, 1893, page 321.

† *Zeitschrift fur Hygiene und Infektionskrankheiten*, Band 18, page 43.

The accounts regarding the infection of the Haj are conflicting. Mr. Consul Monahan states that a case of illness suspected to be cholera occurred in Mecca in the person of an African pilgrim on the 14th December, and that the presence of the disease, at first confined to African pilgrims, was confirmed a few days later. Dr. Delpino states that infection came from the north; and Dr. Bruce Low in the narrative compiled for the *Report of the Medical Officer to the Local Government Board*, ascribes the infection to Russian vessels. Whatever the facts may be, it seems certain that the Hejaz was not first infected by Indian pilgrims.

It has been pointed out that Camaran and the Hejaz were free from cholera during the period when Indian pilgrims were either prevented from going there (1897) or were detained in an observation camp in Bombay prior to their departure (1898-1905), that in the six years before this period cholera appeared at Camaran on eleven occasions, and that it appeared again after the abolition of the observation camp, and it has been argued therefore that the detention of pilgrims in the observation camps at Bombay prevented the outbreak of cholera at Camaran. In 1906 there was no camp, and although the number of pilgrims from Bombay attending the Haj of 1906-07 was the greatest on record, no case of cholera occurred at Camaran. In 1907 there were, as we have seen, a few cases of cholera among Indian pilgrims at Camaran, and the general health of the pilgrims, as evidenced by the mortality that occurred among them on the voyage, was much worse than usual. The higher mortality among the Indian pilgrims was ascribed by Dr. Delpino to the larger proportion of poor, old and cachectic persons among them; among the Javanese and other Malay pilgrims a considerably greater increase in the mortality was ascribed to the warmer weather in which part of the voyage to the holy places was made. It is not impossible that the change of season, owing to the recession of the Haj, had to do not only with the deterioration of the pilgrims' health in 1907-08, but with the occurrence of cholera.

In the eleven years 1897—1907, when the Hejaz was free from cholera, the Haj fell between the 13th May and the 25th January. To get similar dates we have to go back to the ten years 1865—1874, when the Haj fell between the 7th May and the 29th January. Cholera was present in Europe during those ten years, but no importation by ship from India was alleged, indeed there is no reason to suppose that cholera was imported into Europe from India between 1865 and 1882.

If we accept Dr. Delpino's view that latent cholera was carried from Bombay by pilgrims to Camaran and there became manifest, possibly, as suggested by Mr. Vice-Consul Richardson, owing to the pilgrims partaking of unsuitable food, it is clear that a detention of five days at Bombay would not have prevented the outbreak, and that detention in an observation camp would be no safeguard against similar outbreaks in the future, and would be of no advantage in that respect except in so far as additional time would be afforded for some chance cause to transform the latent into active cholera. It seems clear also that the more hygienic the conditions of detention the less chance there would be of the latency being transformed.

Laboratories.

The following is a brief summary of the work done at the *Central Research Institute*, Kasauli, during the year under report.

The enquiry in connection with the etiology and mode of spread of enteric fever was brought to a close in the early part of the year, and the conclusions were published in No. 32 of the Scientific Memoirs (new series). In May an investigation of dysentery was taken in hand and is still in progress, the subject, after preliminary enquiries at Kasauli, being studied at Bombay by two of the officers attached to the Central Institute. In June experiments were commenced in connection with the investigation of lathyrism. The preparation and keeping properties of bacterial vaccines were also investigated and definite conclusions, based on a large number of experiments, were arrived at, which may be summarized as follows. (1) Heat is a harmful agent to use in the sterilization of bacterial vaccines and should therefore be avoided. (2) Carbolic acid to the extent of ·5 or ·6 per cent. is sufficient to render a bacterial vaccine sterile in 24 hours or less, and is the least harmful agent that can be used. (3) Bacterial vaccines prepared by this method give rise to a higher immunising response than when heat is used, and they also retain their original properties unimpaired for a prolonged period. The examination of 1,006 specimens of a miscellaneous character was conducted, a diagnosis and report being given in each case. Advice and assistance was afforded in 114 instances, many of them involving the despatch of cultures and directions. The standardisation of curative sera and bacterial vaccines occupied considerable attention, and the following descriptions of sera were issued, all, except anti-tetanic serum, which is imported from Europe, being prepared at the Institute.

(1) Anti-venomous serum	...	1,159	doses.
(2) Anti-diphtheritic serum	...	1,222	,,
(3) Anti-tetanic serum	...	860	,,
(4) Anti-typhoid vaccine	...	4,035	,,
(5) Anti-staphylococcus vaccine	...	300	,,

In addition, 109 bottles of bile medium were prepared and forwarded to applicants in order that cultivations from the blood of persons suspected to be suffering from enteric fever might be made.

The *Bombay Bacteriological Laboratory* was, as usual, conducted as (*a*) the Plague Laboratory for the whole of India and (*b*) the provincial Bacteriological Laboratory. As regards the work of the former, in spite of the fact that the plague epidemic of 1908 was one of the mildest since the advent of the disease, 533,315 doses of anti-plague vaccine were issued during the year, compared with 620,923 doses issued in 1907, and 176,651, 315,905 and 115,161, respectively, in the years 1906, 1905, and 1904. The number of doses issued during 1908, when plague was not severe, points to the increasing popularity of the prophylactic. It is unfortunately not possible to obtain accurate statistical information as to the results obtained from the use of anti-plague vaccine, but the report contains selections from a large number of replies received to a circular letter issued by the Director, which afford ample evidence in favour of the measure.

In the previous year experiments had been conducted with the Clayton gas apparatus for destroying rats in houses, which failed mainly because the structure of Indian houses freely allows the gas to escape from innumerable apertures, especially in the roof, the concentration of the gas near the roof being so low as not to be lethal to rats. During the year under report experiments were conducted with a small type of Leybold's apparatus specially

designed for the destruction of rats in houses. The machine generates a poisonous gas (*carbon monoxide*), and while effective in killing rats had little or no effect on rat-fleas. As a rat-killing gas it has the advantage that the rats were not frightened away and did not attempt to escape from the treated rooms. The fact that the presence of the gas in quantities fatal to human beings cannot be detected, renders it unsuitable for the disinfection of houses. The Clayton and Leybold's disinfecting gas machines fail to generate and deliver into a room of the ordinary Indian dwelling a large quantity of a fairly concentrated gas in a comparatively short space of time. Experiments, which afford some promise of success, are being undertaken with a view to obtain some gaseous substance which is poisonous to rats and fleas and can be easily generated and delivered into an average Indian dwelling in sufficient quantity to fill a room with an effective gas in a few minutes.

Experiments were also conducted with certain substances and plants to obtain an effective insecticide or insectifuge, which could be easily applied and readily and cheaply obtained, and while not being injurious to man or to clothing, would kill fleas. A final conclusion has not yet been arrived at. Experiments with disinfectants on the plague bacillus and on rat-fleas did not yield fruitful results. Some experiments were also made to test the efficiency of various kinds of rat traps. On behalf of the Health Officer, Bombay City, 110,512 rats were subjected to *post mortem* examination and 13,489 were found infected with plague. During the year second editions, of 5,000 copies, were published of the pamphlets by the Director entitled "*The preparation and use of anti-plague vaccine*" and "*The cause and prevention of the spread of plague in India*".

The work done at the provincial laboratory included the examination of 766 pathological fluids and discharges, the examination of 90 specimens of morbid growths and the brains of 87 rabid animals. For the manufacture of antivenene which is carried out at the Central Research Institute, Kasauli, venom was extracted from 106 snakes. Experiments were conducted with a reputed remedy for snake bite, called "Surucuina" and the preparation was found to be of no value. The research work conducted at the laboratory included an enquiry into malarial fevers in Bombay City, the results being so important that it was considered advisable to entrust the work to a selected officer who could devote his whole time to it. The preliminary enquiries had shown that *Anopheles stephensi* is a malaria carrier in nature, a fact not previously known. An enquiry into relapsing fever was also conducted, but in the absence of the services of a special officer a thorough investigation was not possible. Assistance and advice were afforded to medical practitioners and others. Bacteriological material and equipment were supplied to medical officers in various parts of India, as also certain sera which are stocked for issue, and certain vaccines prepared at the laboratory. Two courses of instruction were given to hospital assistants and many applications to attend the class were received from medical practitioners not in Government service.

The year under report was one of transition at *the King Institute of Preventive Medicine, Madras*, and the work done is therefore not comparable with that of the previous year. An important change made was the transfer, in July, of the pathological part of the work undertaken by the Institute to the Pathological

Department of the Madras Medical College, and for it was substituted investigation more closely connected with the sanitation of the Presidency. A chemical laboratory was established at the Institute during the year and proved very useful. In spite of these changes the number of specimens examined during 1908 numbered 2,907, compared with 1,893 in the previous year. The Director refers to the notable feature that in the examination of specimens for malaria, 85 per cent. yielded negative results, and suggests that this was due to the practice of administering quinine before obtaining films of the blood. The chief work done was connected with the investigations instituted by Major W. W. Clemesha, I.M.S., Acting Sanitary Commissioner for Madras, on town water supplies of the Madras Presidency, which absorbed almost all the resources of the laboratory as regards both staff and material. Major Clemesha's investigations are of great importance as an attempt to determine bacteriological standards of purity for potable waters in India. The results of the investigations have been published as Appendix I to the Annual Report of the Institute for 1908 under the title, "*A Study of the bacteriology of drinking water supplies in tropical climates*".

The usual courses in Minor Sanitary Engineering and in Vaccination were held during the year, and attracted 43 and 25 students, respectively.

The work of the Vaccine Section of the Institute has been noticed on page 132 of this report.

At the *Pasteur Institute, Kasauli*, the number of patients afforded antirabic treatment during 1908 attained the record figure of 1,389 compared with 1,349 in 1907. This is the more remarkable as there is now a Pasteur Institute for Southern India at Coonoor in the Madras Presidency. The total number of patients treated excludes 95 persons who applied for advice but whom it was considered unnecessary to treat. Of the total patients 342 were Europeans, compared with 433 the year before, and 1,047 were natives compared with 916. From the British Army there were 131 patients against 181 in 1907, and from the Native Army (including British officers, their wives and children) 99 against 151, while European civilians numbered 159 against 186, and Native civilians 1,000 against 831. Patients came from all provinces and from the Native States of Rajputana and Kashmir—two patients even came from Madras although there is now an Institute nearer at hand. The percentage of failures to the total number treated fell from 0·44 in 1907 to 0·36 which is the lowest rate on record at the Institute. There were 169 cases of bites from jackals, most of which were very severe and multiple.

The work of the Institute as the provincial Bacteriological Laboratory for the Punjab included the examination of 50 tumours and of 372 specimens in connection with the diagnosis of typhoid and paratyphoid fevers, malaria, and tuberculosis.

At the *Pasteur Institute of Southern India, Coonoor*, 180 persons were treated during the eleven months ending the 29th February 1908 and 340 during the year ending the 28th February 1909. In the first period there was no failure and in the second there were two failures, the percentage being ·58. In one of the cases of failure a month had elapsed between the date of being bitten and the date when treatment was begun. The persons treated during

1908-09 included 27 from the British and Indian armies, (among the number being 4 British officers, 11 European soldiers, and 7 Native soldiers) and 34 European and 39 Eurasian members of the civil population. With the exception of one Eurasian and eight natives from Bengal, all the patients were from British or Foreign territory or from Native States in Southern India, and it may be mentioned that 23 patients were from Ceylon, one from Goa and 14 from French India.

Special enquiries.

Plague.—The Plague Research Commission with its head-quarters at the Bombay Bacteriological Laboratory, continued their investigations into the etiology of plague. The Commission was able to collect further evidence in support of the view that the rat-flea is the chief disseminator of the disease, and was able to show that the differences in the seasonal prevalence of plague in places like Poona and Belgaum, as compared with Bombay and places in the Punjab, can be explained by the difference in the seasonal prevalence of rat-fleas. The Commission was also able to show that the deductions drawn from certain experimental epidemics among guinea-pigs in godowns are also permissible from similar experiments in which wild rats were substituted for guinea-pigs. A large amount of evidence relating to past epidemics in certain districts of the Punjab and the United Provinces tended to prove that the disease is spread in those districts chiefly by the importation of infection from infected to uninfected areas. The Commission was also engaged in an extensive trial of the efficiency of anti-plague serum. Reports of the work done by the Commission will, in due course, be published by the Advisory Committee for Plague Investigation in India.

Dysentery.—The enquiry which is being carried out by officers of the Central Research Institute, Kasauli, was continued at Bombay, and it is now intended to investigate the disease in jails, etc., in Bengal.

Jail dietaries.—The investigations entrusted in January 1908 to Captain D. McCay, I.M.S., Professor of Physiology, Medical College, Calcutta, regarding the suitability of jail dietaries in Bengal, were continued during the year. The results obtained were of great interest and utility, and it was accordingly arranged that the enquiries made in the Bengal jails should be extended to the jails of the United Provinces and Eastern Bengal and Assam. A report of Captain McCay's investigations in Bengal is in the press for publication.

Malaria.—In July 1908 Captain W. H. C. Forster, I.M.S., began an enquiry into the prevalence of malaria in certain *thanas* of the Purnea and Murshidabad districts of Bengal, and in January 1909, Captain S. R. Christophers, I.M.S., Assistant to the Director, Central Research Institute, Kasauli, was placed on special duty to conduct an investigation of the epidemiology of malaria in the Punjab. An enquiry upon malaria is also being conducted by Major J. C. Robertson, I.M.S., in the United Provinces, and Dr. C. A. Bentley, who relieved Captain A. G. McKendrick, I.M.S., is employed on an investigation of the disease in Bombay City.

At the instance of the Secretary of State a Committee was appointed by the Government of India to enquire into the results of the extensive anti-mosquito operations that have been carried out for some years in Lahore Cantonment. Mr. R. Nathan, C.I.E., I.C.S., was the President of the Committee, and Lieutenant-Colonel H. B. Thornhill, C.I.E., I.A., and Major Leonard Rogers,

I.M.S., were the members. The enquiry was commenced at Lahore Cantonment on the 21st October 1909.

Imperial Malaria Conference.

In August 1909 the Government of India addressed the several local Governments and Administrations on the subject of a proposal by the Sanitary Commissioner with the Government of India that a permanent organization should be formed to enquire systematically into problems, both practical and scientific, connected with malaria in India. They pointed out that because it is essential that the people should be induced to adopt the measures that may be most suitable to the areas in which they live, any scheme for an organised attempt to deal with the malaria problem throughout India should be framed in consultation with administrative officers intimately acquainted with local conditions in the various provinces; and they stated that for this reason the Governor-General in Council had decided to convene a Conference to examine the whole question and to draw up a plan of campaign for the consideration of the Government of India and of local Governments. The attendance of certain selected officers was arranged by the Government of India and each local Government and Administration was invited to nominate as delegates (*a*) an administrative officer of experience, (*b*) a medical officer, and (*c*) an Indian gentleman. The Conference was opened at Simla on the 12th of October 1909, by His Excellency the Viceroy and Governor-General, and meetings were held daily until the 18th. The complete report of the Proceedings has now been published.

[*The resolutions and recommendations of the conference are omitted form the present abstract.*]

Periodical reports of the Health Officers of the Presidency towns.

In this report for 1905, it was mentioned that standard forms had been drawn up and brought into use for the compilation of the annual returns of the health statistics, etc., of the Presidency towns. The uniformity secured for the annual returns does not, however, extend to the other periodical reports of the respective municipal Health Officers. In Calcutta a weekly as well as a quarterly return is published, in Rangoon a monthly report, and in Madras and Bombay a quarterly report. The form of these reports also differs widely and it would be a useful measure if they could be prepared, as far as possible, on uniform lines and designed to afford a concise and clear account of events during the period under report.

Scientific Publications.

Since the issue of the last report the following numbers of the Scientific Memoirs have been published by the Sanitary Commissioner with the Government of India:—No. 35, *Blackwater Fever*, by Captain S. R. Christophers, I.M.S., and Dr. C. A. Bentley; No. 36, *Observations on Rabies: with special reference to an atrophic form of the disease occurring in animals*, by Major G. Lamb, I.M.S., and Captain A. G. McKendrick, I.M.S. Attention may also be directed to a recently published work entitled, *Small-pox and Vaccination in British India*, by Major S. P. James, I.M.S.

JOHN T. W. LESLIE,
Lieutenant-Colonel, I.M.S.,
Sanitary Commissioner with the Government of India.

G. C. B. P., Simla.—No. 2114 S. C.—23-5-10.—762.—P.L.W.

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* Under the orders of the War Office these tables are no longer compiled for India.

EUROPEAN TROOPS.

TABLE I.—SUMMARY, SICKNESS AND MORTALITY.

A.—ARMIES AND DIVISIONS.	Years.	Average strength.	RATIO PER MILLE OF STRENGTH. Admissions into hospital.	Constantly sick.	Deaths.	Invalided.	DEATHS FROM Cholera.	Small-pox.	Enteric Fever.	Heat-stroke.	Tubercle of the lungs.	Pneumonia.	Dysentery.	Abscess of the liver.
Northern Army	1907	36,551	744	46	8·34	22	·05	...	2·60	·68	·27	·41	·33	·90
	1908	36,676	939	49	10·72	16	·76	·03	3·22	·79	·33	·46	·41	·87
Southern Army	1907	31,026	786	56	8·32	31	...	·03	3·13	·03	·12	·29	·35	1·19
	1908	30,243	924	44	7·51	16	·23	·03	2·38	·26	·13	·33	·46	·76
1st (Peshawar) Division	1907	2,478	1,158	61	4·84	27	...	...	2·01	...	·40	·40	...	·40
	1908	3,018	1,431	61	18·89	16	2·98	...	7·99	2·32	·66	·33	...	1·33
2nd (Rawalpindi) ,, ...	1907	7,370	738	43	6·46	20	...	...	2·20	·14	...	·41	·28	·83
	1908	6,909	877	48	9·22	21	·87	...	4·63	·43	·58	·43	·29	·87
3rd (Lahore) ,, ...	1907	8,710	648	38	7·58	12	·11	...	2·53	·80	·34	·11	·11	·57
	1908	6,572	881	50	7·70	11	·35	...	1·75	·70	·47	·35	·58	1·05
4th (Quetta) ,, ...	1907	3,422	764	41	7·46	29	...	...	2·36	...	...	·23	·23	·45
	1908	4,003	610	33	5·75	18	·25	...	1·50	·25	·25	·50	...	·50
5th (Mhow) ,, ...	1907	9,731	861	45	10·40	39	...	...	5·24	...	...	·15	·30	1·19
	1908	4,736	899	43	9·06	19	...	·15	3·18	·74	·15	·30	·74	·59
6th (Poona) ,, ...	1907	6,838	723	48	7·46	20	...	·15	2·63	·15	·29	...	·14	1·02
	1908	6,534	642	41	7·04	11	...	...	1·99	...	·15	·61	·15	1·07
7th (Meerut) ,, ...	1907	8,466	821	52	9·57	30	...	...	4·02	·83	·35	·35	·35	·83
	1908	8,656	1,114	58	8·90	16	...	...	2·77	·23	·12	·58	·35	·69
8th (Lucknow) ,, ...	1907	9,628	667	45	10·28	24	·10	...	3·87	1·04	·31	·73	·62	1·45
	1908	9,521	723	42	10·61	17	1·05	·11	2·62	1·26	·21	·53	·52	·94
9th (Secunderabad) ,, ...	1907	8,135	780	62	7·99	38	...	...	3·20	...	·25	·37	·25	1·72
	1908	8,113	706	51	7·49	16	·25	...	2·59	·25	...	·12	·37	·86
Burma Division	1907	3,800	761	46	8·16	21	...	...	·79	...	...	·79	·79	1·32
	1908	3,733	745	51	8·30	17	1·07	...	1·88	...	·27	·27	·80	·54
Aden Brigade	1907	1,099	850	43	7·28	63	...	...	...	...	...	·91	...	·91
	1908	1,100	839	41	4·55	25	...	...	...	...	...	...	1·82	·91
INDIA	1907	69,332	756	46	8·18	26	·03	·01	2·77	·38	·20	·35	·33	1·01
	1908	68,933	840	46	9·78	16	1·10	·03	2·76	·54	·23	·39	·49	·80

B.—GEOGRAPHICAL GROUPS.	Years.	Average strength.	RATIO PER MILLE OF STRENGTH. Admissions.	Constantly sick.	ADMISSIONS FROM Influenza.	Cholera.	Small-pox.	Enteric Fever.	Malaria.	Pyrexia of uncertain origin.	Pneumonia.	Dysentery.	Venereal diseases.
Group I.—Burma Coast and Bay Islands ...	1897-1906	1,148	1,260	77	17·2	...	·8	6·3	135·4	76·6	1·2	36·8	419·8
	1907	1,204	726	46	2·3	...	...	...	80·5	166·2	·8	19·3	133·7
	1908	1,276	683	48	...	...	...	1·6	93·3	81·3	·8	21·2	112·1
II.—Burma Inland	1897-1906	2,105	1,253	78	4·2	1·0	·1	3·7	320·7	41·4	2·6	18·8	338·4
	1907	1,737	778	45	3·5	...	...	5·2	77·6	65·9	·6	18·3	148·3
	1908	1,751	761	48	...	·3	...	2·0	61·7	90·2	1·7	5·1	120·8
IV.—Bengal and Orissa ...	1897-1906	1,973	1,319	80	16·8	1·0	·4	9·8	386·6	31·6	3·5	54·6	333·9
	1907	1,933	791	55	5·6	...	2·0	4·1	128·5	94·2	7·7	18·4	189·5
	1908	1,755	844	45	1·1	...	·6	3·4	149·7	168·6	3·4	22·2	124·1
V.—Gangetic Plain and Chutia Nagpur.	1897-1906	6,558	1,058	73	7·0	1·6	1·0	25·2	196·6	59·0	2·3	32·8	209·4
	1907	6,555	677	43	·9	·3	·3	21·0	83·7	42·4	2·1	16·9	93·9
	1908	6,641	715	40	6·5	1·7	3·6	17·3	136·6	134·6	6·2	16·9	68·5
VI.—Upper Sub-Himalaya ...	1897-1906	12,719	1,146	71	4·4	·7	·4	25·0	319·0	29·1	5·2	17·7	250·1
	1907	13,301	798	45	6·5	·1	·3	13·5	198·1	43·5	3·0	6·4	72·3
	1908	13,428	1,448	57	14·4	·7	1·4	38·3	466·9	74·2	5·0	10·9	54·8
VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1897-1906	4,754	1,243	67	18·2	·1	1·0	15·5	454·3	39·4	6·0	14·9	211·1
	1907	4,621	1,062	55	89·8	...	2·7	7·4	322·6	23·8	4·2	3·7	64·3
	1908	4,894	1,254	53	20·8	3·0	...	20·0	500·4	210·5	5·5	9·8	49·7
VIII.—South-Eastern Rajputana, Central India and Gujarat.	1897-1906	5,922	1,305	81	4·9	·7	1·5	33·5	391·1	23·2	3·6	22·0	332·0
	1907	5,730	842	45	2·9	...	...	23·4	248·9	10·9	2·3	16·2	84·9
	1908	5,585	1,007	44	3·4	...	·4	9·9	407·6	73·1	2·5	15·9	65·7
IX.—Deccan	1897-1906	9,456	1,099	71	10·2	·9	·9	21·1	209·6	34·4	3·6	26·3	330·8
	1907	10,260	709	48	1·3	...	·5	18·1	89·8	31·5	1·9	19·4	96·9
	1908	10,288	668	40	3·9	·1	·4	18·5	139·0	43·7	3·9	21·6	84·8
X.—Western Coast ...	1897-1906	1,550	896	69	2·1	·1	·9	4·0	249·6	17·0	2·9	12·4	288·5
	1907	1,372	738	53	...	·7	...	2·2	188·8	9·5	·7	8·0	118·9
	1908	1,485	703	51	...	...	...	2·0	264·6	5·4	1·3	18·9	109·8
XI.—Southern India	1897-1906	3,302	1,117	68	3·6	·3	·5	16·0	154·9	30·3	2·0	23·7	332·0
	1907	3,537	807	60	·8	...	·3	9·5	42·1	5·4	1·2	19·2	154·2
	1908	3,671	762	55	·3	·2	...	14·2	54·5	42·0	1·6	25·6	117·1
XIIa.—Hill Stations	1897-1906	9,248	830	58	6·2	·3	·1	21·0	111·9	26·7	5·1	13·0	207·8
	1907	11,689	625	39	19·3	...	1·3	13·0	101·7	18·1	2·7	6·1	51·4
	1908	10,923	575	35	3·6	·8	·2	13·6	143·3	35·5	9·8	8·6	60·3
XIIb.—Hill Convalescent Depôts and Sanitaria.	1897-1906	2,088	1,085	75	5·6	·3	·2	18·4	234·8	22·4	4·3	9·6	231·3
	1907	3,815	797	62	4·8	...	...	8·0	177·0	8·8	1·4	10·0	101·8
	1908	3,812	754	65	1·6	...	...	10·8	165·5	19·2	3·6	10·2	66·6
INDIA	1897-1906	66,891	1,191	68	7·1	·9	·6	20·8	266·0	23·0	4·1	22·5	271·5
	1907	69,332	756	46	12·5	·6	·4	13·1	153·8	36·8	2·8	11·7	89·9
	1908	68,933	840	46	6·3	1·3	·8	14·5	244·1	73·9	3·9	14·4	69·6

EUROPEAN TROOPS.

TABLE II.—RATIOS OF ARMIES, 1908.

	Ratios per 1,000 of the average strength.		
	Northern Army.	Southern Army.	India.*
I.—STRENGTH	36,676	30,243	68,933
II.—†CONSTANTLY SICK RATE OF EACH MONTH—			
January	44·7	46·1	44·5
February	38·5	44·9	39·5
March	35·8	39·7	37·0
April	39·5	40·6	39·1
May	42·7	39·7	40·8
June	45·2	41·7	43·7
July	45·3	43·0	44·3
August	48·7	44·3	46·8
September	60·2	50·6	55·6
October	67·4	51·1	59·3
November	66·5	48·6	53·1
December	54·3	41·3	44·2
OF THE YEAR	49·0	44·3	45·7
III.—ADMISSION RATE OF THE YEAR—			
Influenza	10·8	1·1	6·3
Cholera	1·0	·2	1·3
Small-pox	1·3	·2	·8
Enteric Fever	16·6	12·3	14·5
Malaria	312·9	164·2	244·1
Pyrexia of uncertain origin	100·4	44·7	73·9
Tubercle of the lungs	1·6	1·2	1·3
Pneumonia	4·7	2·8	3·9
Respiratory Diseases	18·8	16·4	17·4
Dysentery	11·3	17·9	14·4
Diarrhœa	19·3	13·9	17·7
Hepatic Abscess	1·8	1·6	1·7
,, Congestion and Inflammation	10·5	7·6	8·9
Venereal Diseases	58·3	84·1	69·6
ALL CAUSES	939·5	724·4	839·5
IV.—DEATH RATE OF THE YEAR—			
Cholera	·76	·23	1·10
Small-pox	·03	·03	·03
Enteric Fever	3·22	2·28	2·76
Malaria	·57	·46	·51
Pyrexia of uncertain origin	...	...	...
Heat-stroke	·79	·26	·54
Circulatory Diseases	·25	·26	·25
Tubercle of the lungs	·33	·13	·23
Pneumonia	·46	·33	·39
Respiratory Diseases	·14	·03	·09
Dysentery	·41	·46	·42
Diarrhœa	·03	...	·01
Hepatic Abscess	·87	·76	·80
ALL CAUSES	10·72	7·51	9·78
V.—PERCENTAGE IN 100 ADMISSIONS—			
Influenza	1·15	·16	·75
Cholera	·10	·03	·16
Small-pox	·13	·03	·09
Enteric Fever	1·76	1·70	1·73
Malaria	33·31	22·67	29·07
Pyrexia of uncertain origin	10·69	6·17	8·81
Tubercle of the lungs	·17	·16	·16
Pneumonia	·50	·38	·46
Respiratory Diseases	2·00	2·27	2·07
Dysentery	1·20	2·46	1·71
Diarrhœa	2·05	1·92	2·10
Hepatic Abscess	·19	·21	·20
,, Congestion and Inflammation	1·11	1·05	1·06
Venereal Diseases	6·21	11·60	8·30
VI.—PERCENTAGE IN 100 DEATHS—			
Cholera	7·1	3·1	11·3
Small-pox	·3	·4	·3
Enteric Fever	30·0	30·4	28·2
Malaria	5·3	6·2	5·2
Pyrexia of uncertain origin	...	...	...
Heat-stroke	7·4	3·5	5·5
Circulatory Diseases	2·3	3·5	2·5
Tubercle of the lungs	3·1	1·8	2·4
Pneumonia	4·3	4·4	4·0
Respiratory Diseases	1·3	·4	·9
Dysentery	3·8	6·2	4·3
Diarrhœa	·3	...	·1
Hepatic Abscess	8·1	10·1	8·2

* Including troops on the line of march and with the Field Forces
† Worked on the aggregates.

EUROPEAN TROOPS.

TABLE III.—RATIOS OF GEOGRAPHICAL GROUPS, 1908.

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	IV Bengal and Orissa.	V Ganges-ic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI South-ern India.	XIIa Hill Stations.	XIIb Hill Convalescent Depôts, and Sanitaria.	India.
I.—STRENGTH	1,276	1,751	1,756	6,641	13,428	4,894	5,528	10,288	1,485	3,671	10,923	3,812	68,933
II.—CONSTANTLY-SICK RATE OF EACH MONTH—													
January	81·7	78·3	47·8	42·3	48·1	44·4	31·3	42·6	50·2	55·0	35·1	56·8	44·3
February	66·1	91·4	44·3	32·2	42·1	37·3	27·1	46·2	50·4	56·4	38·1	53·7	39·5
March	46·2	55·5	32·7	33·4	39·8	30·7	28·8	37·0	40·5	54·6	32·9	54·3	37·0
April	54·7	39·7	40·0	40·4	47·3	32·7	32·2	37·3	46·8	54·1	36·7	54·1	39·1
May	49·8	29·7	31·8	41·2	41·3	49·2	34·4	34·8	47·8	54·7	33·0	60·4	40·8
June	51·1	35·7	41·0	44·6	48·8	59·5	28·6	37·2	43·9	52·4	35·1	66·8	43·7
July	44·2	42·7	44·3	42·9	50·4	53·1	28·4	39·6	42·1	54·7	37·2	60·8	44·3
August	46·4	42·7	59·3	37·1	63·3	51·8	44·0	43·8	53·6	52·6	36·4	60·9	46·8
September	42·5	47·0	52·7	43·2	92·1	62·1	72·2	49·4	49·3	63·3	38·4	59·7	55·6
October	40·4	43·6	52·2	52·5	97·8	86·3	72·1	45·1	69·7	62·6	39·1	71·3	59·3
November	38·5	48·3	44·4	43·6	87·0	81·2	76·9	39·4	65·1	53·2	36·1	89·5	53·1
December	33·8	43·0	40·6	31·9	57·3	64·4	63·4	32·5	54·5	41·4	34·0	92·1	44·2
OF THE YEAR	48·1	48·1	43·4	40·1	56·1	52·5	44·4	40·0	50·6	54·5	35·4	65·3	45·7
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	...	1·1	6·5	14·4	20·8	3·4	3·0	...	·3	3·0	1·6	6·3
Cholera	...	2·3	...	1·9	·7	2·0	...	·1	...	·3	·5	...	1·2
Small-pox	...	...	·6	3·6	1·4	...	·4	·4	...	...	·2	...	·8
Enteric Fever	1·6	12·0	3·4	4·3	18·3	26·0	9·9	18·5	2·0	8·2	13·6	10·8	14·5
Malaria	93·3	61·7	140·7	136·6	466·9	500·4	407·6	139·9	264·6	54·5	113·1	165·5	244·1
Pyrexia of uncertain origin	82·3	90·2	168·6	134·6	72·2	210·5	73·1	43·7	5·4	42·0	25·5	19·2	73·9
Rheumatic Fever	7·2	·6	5·1	4·7	7·2	7·2	6·3	4·5	2·0	7·0	14·2	10·8	7·2
Tubercle of the lungs	1·6	3·4	2·3	2·6	1·3	1·4	·5	2·1	3·4	·5	1·0	2·1	1·3
Pneumonia	·8	1·7	3·4	6·3	5·6	5·5	2·5	3·9	1·3	1·6	2·8	2·6	3·9
Respiratory Diseases	16·5	9·7	20·5	16·7	24·0	14·1	18·1	17·2	4·0	22·6	13·2	10·4	17·1
Dysentery	21·2	5·1	12·0	15·9	10·9	9·8	15·9	21·6	18·9	25·6	8·6	10·2	14·4
Diarrhœa	2·4	14·3	15·9	10·1	22·6	28·0	21·5	13·1	9·4	21·2	16·1	15·2	17·7
Hepatic { Abscess / Congestion and Inflammation	·8	·6	...	1·8	1·7	1·6	·5	1·6	1·3	1·4	1·3	7·1	1·7
Venereal Diseases	3·1	12·0	13·7	4·2	22·8	5·8	8·9	6·3	8·1	9·5	9·6	15·7	8·9
ALL CAUSES	114·1	120·5	124·1	68·5	54·8	49·7	65·7	82·6	109·8	117·1	50·3	66·6	69·6
	683·4	761·3	1,140·0	714·2	1,148·2	1,254·7	1,006·0	667·8	703·0	761·9	574·9	753·7	839·5
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	2·28	...	1·51	·67	2·04	...	·10	...	·27	...	...	1·10
Small-pox	...	...	...	·15	...	...	...	·10	...	...	...	...	·03
Enteric Fever	·38	3·43	...	3·61	3·87	4·50	3·26	3·21	1·35	1·09	1·56	2·10	2·76
Malaria	1·57	...	...	·30	1·12	·41	1·09	·19	1·35	...	·27	·26	·51
Pyrexia of uncertain origin	...	...	...	...	...	...	...	...	...	...	...	...	...
Heat-stroke	...	...	...	1·51	·67	1·84	·72	·19	...	·27	·09	·26	·54
Circulatory Diseases	·78	...	·57	·30	·30	·20	·48	·10	·67	·82	·09	...	·25
Tubercle of the lungs	·78	...	·57	...	·30	·61	...	·10	·67	...	·27	·52	·23
Pneumonia	...	·57	1·14	·45	·32	·20	·18	·49	...	·27	·64	·26	·39
Respiratory Diseases	...	...	...	·15	·15	·20	·18	...	·67	...	...	...	·09
Dysentery	·78	1·14	·57	·45	·69	...	·54	·68	...	...	·09	·26	·42
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	·26	·01
Hepatic Abscess	·78	...	...	·90	·82	1·02	·36	·68	1·35	·82	·37	3·41	·80
ALL CAUSES	7·05	9·14	5·69	12·80	13·99	13·46	9·41	7·78	10·10	6·27	5·68	9·41	9·18
V.—PERCENTAGE IN 100 ADMISSIONS—													
Influenza	...	...	·13	·91	1·26	1·66	·34	·45	...	·04	·53	·21	·75
Cholera	...	·30	...	·23	·06	·16	...	·01	...	·04	·10	...	·16
Small-pox	...	...	·07	·31	·12	...	·04	·06	...	...	·01	...	·09
Enteric Fever	·23	1·58	·40	2·42	1·60	4·60	·99	2·77	·20	1·86	2·47	1·43	1·73
Malaria	13·65	8·10	16·67	19·91	40·07	30·90	40·48	20·82	37·64	7·15	19·72	21·96	19·07
Pyrexia of uncertain origin	12·04	11·85	19·97	18·84	6·28	16·78	7·26	6·55	·77	5·51	4·43	2·54	8·81
Rheumatic Fever	1·03	·08	·61	·57	·63	·57	·63	·67	·20	1·04	2·47	1·43	·86
Tubercle of the lungs	·23	·45	·27	·27	·11	·11	·05	·16	·48	·07	·18	·28	·16
Pneumonia	·11	·23	·40	·88	·49	·44	·25	·58	·19	·21	·44	·33	·46
Respiratory Diseases	2·41	1·28	2·43	2·34	2·00	1·12	1·80	2·60	·57	2·07	2·20	2·58	2·07
Dysentery	3·10	·68	1·42	2·36	·95	·28	1·58	3·33	2·08	3·36	1·60	1·36	1·71
Diarrhœa	·34	1·88	1·89	1·41	1·07	2·23	2·14	1·97	1·34	1·47	2·80	2·02	2·10
Hepatic { Abscess / Congestion and Inflammation	·11	·08	...	·25	·15	·13	·05	·23	·19	·18	·22	·94	·20
Venereal Diseases	16·40	15·83	14·72	9·39	4·77	3·76	6·52	12·37	15·61	15·37	8·74	8·84	8·39
VI.—PERCENTAGE IN 100 DEATHS—													
Cholera	...	25·0	...	11·8	5·6	15·2	...	1·2	...	4·3	...	...	11·3
Small-pox	...	...	...	1·2	...	...	...	1·2	...	...	...	...	·3
Enteric Fever	11·1	37·5	...	28·2	33·3	33·3	34·6	41·7	13·3	17·4	27·4	22·2	28·2
Malaria	22·2	...	...	2·4	9·3	3·0	11·5	2·5	13·3	...	4·8	2·8	5·2
Pyrexia of uncertain origin	...	...	...	...	...	...	...	...	...	...	...	...	...
Heat-stroke	...	...	...	11·8	5·6	13·6	7·7	2·5	...	4·3	5·4	2·8	5·3
Circulatory Diseases	11·1	...	10·0	2·4	2·5	1·5	1·9	1·2	6·7	13·0	1·6	...	2·5
Tubercle of the lungs	11·1	...	10·0	...	2·5	4·5	...	1·2	6·7	...	4·8	5·6	2·4
Pneumonia	...	6·2	20·0	3·5	3·1	1·5	1·9	2·2	...	4·3	11·3	2·8	4·6
Respiratory Diseases	...	...	...	1·2	1·2	1·5	1·9	...	6·7	...	...	...	1·9
Dysentery	11·1	12·5	10·0	3·5	5·0	...	5·8	8·8	...	...	1·6	2·8	4·2
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	2·8	·3
Hepatic Abscess	11·1	...	...	7·1	6·8*	7·6	3·8	8·8	13·3	13·0	6·5	36·1	8·2

* Worked on the aggregates.

European Troops.

Table V.—Admission and Death rates from Enteric fever in stations of over 1,000 in strength.

Stations.	1908.		Decennium, 1897-1906.		Stations.	1908.		Decennium, 1897-1906.	
	Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.		Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.
Jubbulpore ...	34·6	3·95	32·1	8·44	Ranikhet ...	14·0	3·65	23·4	3·62
Rawalpindi ...	31·9	6·17	26·3	5·29	Kirkee ...	10·1	1·84	30·6	4·47
Peshawar ...	31·2	7·21	20·4	11·48	Poona ...	9·8	·52	23·9	5·12
Meerut ...	27·4	6·61	35·9	10·21	Ambala ...	8·3	2·61	30·9	7·78
Jhansi ...	26·5	8·85	35·6	10·75	Karachi ...	6·0	·86	5·5	1·63
Secunderabad ...	25·9	5·14	22·0	4·87	Fort William ...	5·1	·4	3·4	·36
Cawnpore ...	25·4	7·51	15·5	3·13	Chakrata ...	4·3	...	24·9	2·80
Sialkot ...	20·9	5·43	16·1	5·29	Mhow ...	4·1	...	35·6	6·45
Bangalore ...	19·0	1·77	23·9	4·03	Bareilly ...	3·5	...	14·9	3·11
Quetta ...	17·9	2·13	30·1	7·34	Wellington ...	2·9	·96	11·2	1·36
Belgaum ...	14·6	3·88	8·2	2·44	Aden ...	1·8	...	6·6	2·48
Lucknow ...	14·3	4·48	39·3	8·35	Colaba ...	1·7	·87	3·2	1·62
					Rangoon ...	1·6	·78	6·9	1·78

Table VI.—Arrivals, age and length of residence in relation to Venereal Diseases and Enteric fever.

Year.	Arrived in India.*		Year.	Men						Ratio per cent. of total admission.	
				Per cent of Strength.			Strength.	Ratio per 1,000.			
				Age.	Length of residence.	Married. ‡		Admissions.			
	Men.	Women.		Under 25 years.	Under 5 years.			All causes.	Venereal Diseases.	Venereal Diseases.	Enteric Fever.
1889-90 ...	12,270	532	1889	49	78	3·60	69,266	1,498·0	481·5	32·14	1·53
1890-91 ...	14,046	542	1890	50	80	3·70	67,823	1,520·2	503·5	33·12	1·22
1891-92 ...	15,456	529	1891	51	79	3·36	67,030	1,379·1	400·7	29·06	1·48
1892-93 ...	15,894	540	1892	51	80	3·29	68,139	1,517·3	409·9	27·01	1·46
1893-94 ...	15,090	482	1893	53	79	3·29	70,091	1,414·9	466·0	32·94	1·41
1894-95 ...	15,957	517	1894	54	81	...†	71,082	1,508·0	511·4	33·91	1·38
1895-96 ...	14,346	654	1895	55	83	...	71,031	1,461·8	522·3	35·73	1·80
1896-97 ...	14,805	545	1896	56	82	...	70,484	1,386·7	511·6	36·89	1·84
1897-98 ...	16,227	543	1897	55	84	...	68,395	1,556·9	485·7	31·20	2·08
1898-99 ...	16,911	648	1898	54	81	...	67,741	1,436·9	362·9	25·26	2·57
1899-1900 ...	3,369	168	1899	53	78	...	67,697	1,148·7	313·4	27·28	1·79
1900-01 ...	5,958	285	1900	45	69	...	60,353	1,143·2	298·1	26·07	1·40
1901-02 ...	18,594	438	1901	42	63	..	60,838	1,104·3	276·0	24·99	1·16
1902-03 ...	24,840	961	1902	43	68	...	60,540	1,078·4	281·4	26·09	1·35
1903-04 ...	15,126	758	1903	51	76	...	70,425	1,033·4	247·0	23·90	1·90
1904-05 ...	16,366	820	1904	52	80	...	71,083	900·4	198·5	22·05	2·18
1905-06 ...	15,178	804	1905	52	84	...	71,343	834·3	153·7	18·42	1·93
1906-07 ...	18,636	912	1906	51	84	...	70,272	870·8	117·3	13·47	1·79
1907-08 ...	16,083	1,049	1907	...†	...†	...	69,832	756·4	89·9	11·89	1·74
1908-09 ...	17,182	1,130	1908	...†	...†	...	68,933	839·5	69·6	8·30	1·73

* In ordinary years the departures *plus* the deaths nearly balance the arrivals. † Return abolished. ‡ On the 1st May of each year.

EUROPEAN TROOPS.

TABLE IX.—STATISTICS OF OFFICERS.

A.—SICKNESS AND MORTALITY AMONG OFFICERS OF THE BRITISH ARMY IN 1908. (FROM THE MEDICAL RETURNS OF THE ARMY.)

	Northern Army.		Southern Army.		India.*	
STRENGTH	1,113		1,002		2,188	
CASES REMAINING FROM 1907	23		17		40	
	Ratios.	Actuals.	Ratios.	Actuals.	Ratios.	Actuals.
CONSTANTLY SICK	28·3	31·52	23·8	23·81	25·5	55·86
INVALIDS	40·43	45	46·92	47	42·05	92
ADMISSIONS.						
Influenza	26·1	29	10·0	10	17·8	39
Cholera	·9	1	...	...	·5	1
Small-pox	6·3	7	1·0	1	3·7	8
Enteric Fever	30·5	34	19·0	19	25·7	54
Malaria	159·0	177	86·8	87	125·2	274
Pyrexia of uncertain origin	67·3	75	49·9	50	58·5	128
Tubercle of the lungs	1·8	2	1·0	1	1·4	3
Pneumonia	2·7	3	...	...	1·4	3
Respiratory Diseases	12·6	14	12·0	12	11·9	26
Dysentery	19·8	22	30·9	31	27·9	61
Diarrhœa	27·0	30	27·0	27	30·6	67
Hepatic Abscess	...	...	2·0	2	·9	2
Congestion and Inflammation	19·8	22	15·0	15	17·4	38
Venereal Diseases	4·5	5	3·0	3	3·7	8
ALL CAUSES	722·4	804	580·8	582	668·2	1,462
DEATHS.						
Cholera	·90	1	...	...	·46	1
Small-pox	...	...	...	...	...	...
Enteric Fever	·90	1	...	...	1·37	3
Malaria	·90	1	...	...	·46	1
Pyrexia of uncertain origin	...	...	...	...	...	...
Heat-stroke	...	...	...	...	...	...
Circulatory Diseases	...	...	...	...	...	...
Tubercle of the lungs	...	...	...	...	...	...
Pneumonia	·90	1	...	...	·46	1
Respiratory Diseases	...	...	...	...	...	...
Dysentery	...	...	2·00	2	·91	2
Diarrhœa	...	...	...	...	...	...
Hepatic Abscess	...	...	1·00	1	·46	1
ALL CAUSES	7·19	8	6·99	7	9·60	21
DEATHS OUT OF HOSPITAL	...	...	3·99	4	3·20	7

* Including officers on the line of march and with the Field Forces.

B.—CAUSES OF DEATH AMONG EUROPEAN OFFICERS OF THE BRITISH AND INDIAN ARMIES IN 1908. (FROM NON-MEDICAL SOURCES.)

ARMIES.	Strength in India, whether on leave or not, on the 1st of July 1908.	Strength in Europe or beyond sea on 1st July 1908, whether on furlough or sick leave.	IN INDIA. Cholera.	Small-pox.	Enteric Fever.	Malaria.	Pyrexia of uncertain origin.	Heat-stroke.	Circulatory Diseases.	Tubercle of the lungs.	Pneumonia.	Respiratory Diseases.	Dysentery.	Diarrhœa.	Hepatic Abscess.	Total.	Deaths in England and other countries.	Deaths at sea.	GRAND TOTAL.	Ratio per 1,000.
BRITISH ...	2,922	633	1	...	3	1	...	...	...	...	1	...	2	...	1	21	1	3	25	7·05
INDIAN ...	3,186	975	3	...	6	...	...	...	2	...	...	...	1	...	1	13	4	1	23	5·53

NATIVE TROOPS.

TABLE X.—SUMMARY, SICKNESS AND MORTALITY.

A.—ARMIES AND DIVISIONS.	Years.	Average strength.	RATIO PER MILLE OF STRENGTH.												
			Admissions into hospital.	Constantly sick.	DEATHS FROM										Mortality including absent deaths.
					Cholera.	Small-pox.	Enteric fever.	Malaria.	Tubercle of the lungs.	Pneumonia.	Dysentery.	Abscess of the liver.	All causes.		
Northern Army	1907	61,163	712	24	·08	·03	·39	·93	·38	2·62	·20	·05	7·28		
	1908	62,141	797	26	1·24	·02	·76	·84	·50	2·96	·13	·03	8·69		
Southern Army	1907	50,484	584	21	·38	·06	·40	·46	·30	1·64	·18	·10	5·68		
	1908	50,822	599	21	·55	·04	·51	·39	·31	1·71	·39	...	6·30		
1st (Peshawar) Division ...	1907	9,198	835	27	...	...	·22	·98	·11	5·00	·22	...	10·00		
	1908	9,205	944	33	1·96	...	·33	1·63	·22	3·37	·22	...	10·65		
2nd (Rawalpindi) Division ...	1907	10,949	682	27	·09	·09	·64	·64	·55	2·56	·37	·09	7·49		
	1908	10,568	694	26	3·50	...	1·51	·38	·47	3·28	·28	...	11·26		
3rd (Lahore) Division ...	1907	11,684	428	17	·09	...	·26	·86	·43	1·45	·17	...	6·25		
	1908	11,801	582	18	·34	...	·42	1·02	·59	3·14	...	...	7·46		
4th (Quetta) ,, ...	1907	7,964	599	24	...	·25	·25	·88	·25	3·64	·63	...	8·65		
	1908	9,192	608	21	·44	...	·87	·22	·33	3·81	·33	...	8·38		
5th (Mhow) ,, ...	1907	10,234	665	22	·68	·06	·43	·49	·25	1·23	...	...	5·24		
	1908	15,200	693	21	·07	·13	·66	·39	·33	·99	·20	...	4·47		
6th (Poona) ,, ...	1907	9,375	583	20	·21	...	·32	·21	·11	1·07	...	·11	4·59		
	1908	9,994	542	22	...	...	·60	·50	·20	1·00	·50	...	5·30		
7th (Meerut) ,, ...	1907	10,527	630	22	...	...	·47	·95	·57	1·33	·09	·09	5·08		
	1908	11,702	720	26	·26	·09	1·28	·77	·85	1·62	...	·09	7·61		
8th (Lucknow) ,, ...	1907	10,433	708	21	...	...	·19	1·25	·29	1·05	·19	·10	5·08		
	1908	10,593	666	23	·96	...	·10	·67	·67	2·89	·10	...	7·51		
9th (Secunderabad) Division ...	1907	10,306	370	16	·58	...	·78	·19	·19	1·75	·19	·19	5·82		
	1908	10,415	476	19	2·20	...	·19	·19	·29	1·24	·48	...	8·33		
Burma Division	1907	5,096	650	26	...	...	...	·79	·39	·59	...	·39	3·73		
	1908	4,950	663	26	...	...	...	·81	·40	1·41	·20	...	4·24		
Kohat, Derajat and Bannu Brigades	1907	8,372	1,240	34	3·6	·12	·60	·96	·24	5·26	·12	...	9·91		
	1908	8,472	1,330	33	5·9	...	·83	·47	...	3·90	·24	·12	8·03		
Aden Brigade	1907	1,509	861	29	...	...	...	...	2·65	1·90	1·33	...	7·29		
	1908	1,041	621	25	...	...	...	·96	·96	6·72	2·88	...	13·45		
Army of India	1907	1,26,392	629	22	·19	·04	·35	·66	·33	1·99	·20	·06	6·27	8·51	
	1908	1,26,975	674	23	·91	·02	·57	·58	·42	2·20	·22	·02	7·41	8·49	

* Worked on the average annual strength of the troops present with and absent from their regiments during the year.

B—GEOGRAPHICAL GROUPS.	Years.	Average strength.*	RATIO PER MILLE OF STRENGTH.										
			Admissions.	Constantly sick.	ADMISSIONS FROM								
					Influenza.	Cholera.	Small-pox.	Enteric fever.	Malaria.	Pyrexia of uncertain origin.	Pneumonia.	Dysentery.	Venereal diseases.
Group I—Burma Coast and Bay Islands.	1897-1906	1,435	721	27	5·4	·1	·2	·1	191·4	17·8	2·6	64·9	47·5
	1907	1,297	563	22	...	...	...	...	165·8	57·8	·8	23·1	5·4
	1908	1,286	632	19	...	...	...	...	130·6	112·8	2·3	83·2	13·2
„ II.—Burma Inland ...	1897-1906	3,955	865	32	1·9	·2	·1	·1	427·4	9·2	2·6	31·3	31·8
	1907	2,807	629	26	...	...	...	·4	163·2	57·0	4·6	21·0	16·4
	1908	2,823	661	27	...	...	...	2·1	230·3	3·5	6·4	22·7	13·5
„ III.—Assam	1897-1906	1,327	859	37	3·5	1·3	...	2·0	349·3	3·2	8·6	79·9	48·1
	1907	964	1,059	30	...	...	1·0	2·1	429·5	2·1	2·1	24·9	45·6
	1908	923	882	23	...	2·2	...	...	446·4	9·8	8·7	33·6	23·8
„ IV.—Bengal and Orissa ...	1897-1906	2,528	972	35	8·9	·4	·5	·4	504·3	5·7	5·6	64·8	36·6
	1907	2,022	907	33	1·5	...	·5	...	431·3	4·9	7·4	54·9	22·7
	1908	2,219	731	28	·5	...	...	·9	240·2	25·7	9·9	81·1	16·7
„ V.—Gangetic Plain and Chutia Nagpur.	1897-1906	6,251	575	24	4·3	1·0	·6	·4	175·7	6·0	7·8	38·4	26·4
	1907	5,990	444	16	·2	...	·3	...	100·7	14·2	8·3	32·6	10·9
	1908	5,972	604	20	·2	2·7	1·3	·2	252·2	7·5	13·9	55·4	15·2
„ VI.—Upper Sub-Himalaya	1897-1906	15,882	618	24	1·8	·7	·6	·8	238·9	3·5	15·0	27·9	24·7
	1907	20,904	582	20	4·9	·2	·5	2·6	223·5	19·9	11·6	18·8	14·4
	1908	21,426	704	23	1·7	·8	1·1	5·2	334·3	22·4	14·1	39·5	13·9
VII.—North-West Frontier, Indus Valley, and North-Western Rajputana.	1897-1906	16,892	894	30	4·7	1·5	·7	·4	394·1	4·9	22·4	53·0	17·7
	1907	18,024	951	28	12·9	·2	·1	1·4	441·0	2·2	23·0	44·9	7·5
	1908	17,733	1,116	32	3·3	1·5	·2	4·2	544·3	7·8	21·3	53·3	8·7
VIII.—South-Eastern Rajputana, Central India and Gujarat.	1897-1906	12,058	778	28	1·8	1·0	·7	·4	338·9	8·7	14·7	29·6	41·3
	1907	13,094	656	21	3·7	·1	·3	·9	255·7	7·9	10·9	26·0	14·4
	1908	12,114	687	21	1·0	...	·5	1·2	288·8	2·6	12·3	23·9	17·0
„ IX.—Deccan ...	1897-1906	17,042	613	23	4·0	1·4	·6	·4	207·9	12·2	8·0	30·2	42·9
	1907	16,794	492	19	3·6	1·2	·7	2·4	79·2	37·5	6·5	32·7	23·2
	1908	17,631	485	19	9·2	1·9	3·0	2·4	106·9	23·1	6·6	30·7	23·7
„ X.—Western Coast ...	1897-1906	2,279	739	31	2·4	·3	1·4	·1	203·1	11·2	10·2	60·1	51·2
	1907	1,652	930	31	...	...	...	2·4	250·0	2·4	10·9	73·2	24·8
	1908	1,707	920	34	1·8	...	1·2	2·3	300·5	12·9	5·9	70·3	53·3
„ XI.—Southern India ...	1897-1906	6,790	616	29	3·0	1·6	·6	·3	162·3	21·8	8·8	23·3	42·6
	1907	3,880	415	16	·5	1·5	1·5	1·0	58·7	29·1	7·0	18·3	28·6
	1908	4,623	561	21	·2	2·4	·2	·4	155·5	17·7	7·8	35·0	26·0
„ XII.—Hill Stations ...	1897-1906	20,412	845	34	9·7	·5	·3	1·0	337·5	12·3	19·0	45·8	34·6
	1907	22,710	634	25	14·3	...	·4	1·7	223·7	14·9	16·8	37·2	13·0
	1908	23,465	625	23	4·8	1·8	·2	3·7	236·3	18·9	15·5	33·2	13·7
Army of India.	1897-1906	1,25,487	725	27	5·1	1·0	·5	·5	280·5	8·8	13·6	42·7	30·5
	1907	1,26,392	629	22	6·5	·3	·4	1·4	225·0	16·6	12·4	33·5	14·7
	1908	1,26,975	674	23	3·8	1·4	·8	2·8	266·2	16·2	12·8	39·5	15·2

*The decennial ratios are worked on the total strength of the ten years period.

NATIVE TROOPS.

TABLE XI.—RATIOS OF ARMIES.

	Ratio per 1,000 of the average strength.		
	Northern Army.	Southern Army.	Army of India.
I.—AVERAGE ANNUAL STRENGTH	62,141	50,822	136,975
II.—CONSTANTLY SICK RATE OF EACH MONTH—			
January	24·2	21·5	22·0
February	21·2	19·5	18·6
March	18·3	18·2	17·8
April	19·4	18·2	18·6
May	21·9	18·0	19·6
June	23·5	17·7	20·9
July	22·1	19·0	20·2
August	24·4	22·4	23·0
September	31·8	25·2	27·7
October	37·0	24·6	29·6
November	36·3	26·0	29·7
December	30·2	23·5	25·4
OF THE YEAR	26·0	21·4	22·8
III.—ADMISSION RATE OF THE YEAR—			
Influenza	2·6	4·4	3·8
Cholera	1·6	·9	1·4
Small-pox	·6	1·3	·8
Enteric Fever	4·0	1·8	2·8
Malaria	368·2	186·3	266·2
Malta Fever	·3	·1	·2
Pyrexia of uncertain origin	15·3	19·9	16·2
Plague	·0	·0	·1
Tubercle of the lungs	3·6	2·6	3·0
Pneumonia	15·8	10·1	12·8
Respiratory Diseases	17·2	22·6	20·2
Dysentery	43·0	35·8	39·5
Diarrhœa	7·9	9·9	8·8
Hepatic { Abscess	·1	·1	·1
Hepatic { Congestion and Inflammation	·8	·7	·7
Scurvy	2·2	2·2	1·5
Venereal Diseases	12·8	20·1	15·2
ALL CAUSES	796·6	598·7	674·4
IV.—DEATH RATE OF THE YEAR—			
Cholera	1·24	·55	·91
Small-pox	·02	·04	·02
Enteric Fever	·76	·51	·57
Malaria	·84	·39	·58
Malta Fever	...	...	...
Pyrexia of uncertain origin	·13	·06	·09
Plague	...	·28	·11
Circulatory Diseases	·21	·16	·17
Tubercle of the lungs	·59	·31	·42
Pneumonia	2·96	1·71	2·30
Respiratory Diseases	·34	·30	·29
Dysentery	·13	·39	·22
Diarrhœa	·02	·22	·06
Hepatic Abscess	·03	...	·02
Anæmia and Debility	·65	·20	·13
ALL CAUSES	8·69	6·30	7·41
V.—PERCENTAGE IN 100 ADMISSIONS—			
Influenza	·33	·74	·56
Cholera	·21	·16	·20
Small-pox	·07	·22	·12
Enteric Fever	·51	·33	·41
Malaria	46·23	31·11	39·47
Malta Fever	·04	·01	·03
Pyrexia of uncertain origin	1·92	3·32	2·40
Plague	·01	·11	·04
Tubercle of the lungs	·45	·43	·44
Pneumonia	1·99	1·69	1·90
Respiratory Diseases	2·16	3·77	3·00
Dysentery	5·40	5·97	5·86
Diarrhœa	·99	1·64	1·30
Hepatic { Abscess	·01	·02	·01
Hepatic { Congestion and Inflammation	·10	·12	·11
Scurvy	·15	·36	·22
Venereal Diseases	1·62	3·36	2·26
VI.—PERCENTAGE IN 100 DEATHS—			
Cholera	14·26	8·75	12·35
Small-pox	·19	·62	·32
Enteric Fever	8·70	8·12	7·76
Malaria	9·63	6·25	7·86
Malta Fever	...	...	...
Pyrexia of uncertain origin	1·48	·94	1·17
Plague	...	4·38	1·49
Circulatory Diseases	2·48	2·50	2·34
Tubercle of the lungs	5·74	5·00	5·63
Pneumonia	34·07	27·19	30·65
Respiratory Diseases	3·89	4·69	3·93
Dysentery	1·48	6·25	2·98
Diarrhœa	·29	1·88	·85
Hepatic Abscess	·38	...	·25
Anæmia and Debility	5·56	3·12	1·70

NATIVE TROOPS.

TABLE XII.—RATIOS OF GEOGRAPHICAL GROUPS.

	RATIO PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hill Stations.	Army of India.
I.—AVERAGE ANNUAL STRENGTH	1,286	2,823	923	2,219	5,972	21,426	17,733	12,114	17,631	1,707	4,623	23,465	126,975
II.—CONSTANTLY SICK RATE OF EACH MONTH—													
January	14·9	32·7	15·1	34·6	14·2	21·3	31·6	19·1	18·9	45·5	33·8	23·3	22·8
February	19·6	25·2	15·9	18·2	14·2	16·1	20·3	14·4	15·9	36·6	25·5	22·6	18·6
March	16·8	32·3	17·3	18·3	12·7	13·9	25·0	16·6	16·4	30·2	19·7	19·3	17·8
April	15·0	27·2	21·6	19·1	14·2	16·5	23·3	16·8	18·4	28·9	18·7	18·3	18·6
May	19·1	23·7	20·5	17·6	20·1	19·6	25·9	16·4	19·5	25·2	14·6	18·9	19·6
June	24·3	24·1	22·5	19·1	15·9	19·8	30·5	14·6	16·6	28·7	17·9	21·6	20·9
July	23·7	28·8	23·7	31·6	14·3	17·9	27·2	15·5	17·6	26·3	23·5	21·4	20·2
August	21·7	27·5	24·0	33·9	21·6	19·9	27·6	20·4	20·4	27·4	23·7	26·0	23·0
September	22·8	23·8	27·9	30·4	25·4	31·4	36·2	28·9	21·6	32·8	19·7	29·2	27·7
October	16·7	27·9	32·4	33·3	31·7	38·4	44·5	31·1	21·3	36·9	20·6	26·3	29·6
November	22·3	26·8	27·9	35·2	31·2	35·2	47·7	30·3	21·6	39·4	19·2	27·9	29·7
December	16·9	28·1	24·9	30·1	24·2	29·2	37·9	24·2	21·8	43·8	14·9	24·7	25·4
OF THE YEAR	18·7	27·3	22·8	27·9	20·1	23·2	32·4	21·3	19·2	34·0	20·8	23·4	22·8
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	...	...	·5	·2	1·7	3·3	1·0	9·2	1·8	·2	4·8	3·8
Cholera	...	...	2·2	...	2·7	·8	1·5	...	1·9	...	2·4	1·8	1·4
Small-pox	...	...	...	...	1·3	1·1	·2	·5	3·0	1·2	·2	·2	·8
Enteric Fever	...	2·1	...	·9	1·2	5·2	4·2	1·2	2·4	2·3	·4	3·7	2·8
Malaria	130·6	230·3	446·4	240·2	252·2	334·3	544·3	288·8	106·9	300·5	155·5	230·3	266·2
Malta Fever	...	...	...	...	...	·7	·1	·2	...	...	...	·1	·2
Pyrexia of uncertain origin	112·8	3·5	9·8	25·7	7·5	22·4	7·8	2·6	23·1	12·9	17·7	18·9	16·2
Plague	...	·4	...	...	...	·1	...	...	1·0	1·2	2·2	·1	·3
Tubercle of the lungs	1·6	1·1	...	5·4	5·5	2·9	3·9	3·0	1·4	3·9	1·9	3·9	3·0
Pneumonia	2·3	6·4	8·7	9·9	13·9	14·1	21·3	12·3	6·5	5·9	7·8	15·5	12·8
Respiratory Diseases	28·0	20·5	26·0	29·7	11·2	11·7	22·8	18·2	16·4	72·1	17·1	21·8	20·2
Dysentery	83·2	22·7	33·6	81·1	35·4	39·5	53·3	23·9	30·7	70·3	35·0	33·2	39·5
Diarrhœa	3·1	18·1	19·3	2·3	2·2	5·0	13·8	6·9	5·4	17·0	6·9	11·8	8·8
Hepatic { Abscess / Congestion and Inflammation	...	...	...	...	·2	·0	·1	...	·2	...	·6	...	·1
Scurvy	·8	...	...	2·3	·3	·7	·7	·5	·2	1·8	·4	1·1	·7
Venereal Diseases	...	...	...	7·7	·8	·5	2·3	2·5	·6	6·4	...	2·0	1·5
	13·2	13·5	23·8	16·7	15·2	13·9	8·7	17·0	23·7	53·3	26·0	13·7	15·2
ALL CAUSES	632·2	661·0	881·9	730·5	603·6	703·7	1,115·6	686·9	485·3	920·3	560·7	624·8	674·4
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	2·17	...	1·34	·61	1·41	·08	·79	...	1·95	1·41	·91
Small-pox	...	...	...	...	...	·05	...	·08	·06	...	...	...	·02
Enteric Fever	...	...	...	...	...	·98	·51	·58	·45	1·76	...	1·07	·57
Malaria	...	1·42	1·08	·45	·84	·56	·68	·58	·17	2·34	...	·94	·58
Malta Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin	...	...	...	·45	...	·05	·17	...	·06	...	·22	·17	·09
Plague	...	·35	...	...	...	...	...	...	·34	·59	1·30	...	·11
Circulatory Diseases	...	·35	...	...	...	·23	·06	·17	·23	·59	·22	·26	·17
Tubercle of the lungs	...	...	...	1·80	·33	·32	·11	·11	·11	...	·65	·85	·42
Pneumonia	...	2·48	2·17	2·29	3·35	2·75	3·89	1·49	·79	1·76	1·51	2·56	2·20
Respiratory Diseases	...	...	...	1·35	...	·37	·23	·12	·17	·59	·87	·47	·29
Dysentery	·78	...	...	...	...	·14	·23	·25	·23	1·17	·87	·17	·22
Diarrhœa	...	...	...	...	...	·05	...	·17	...	...	...	·17	·06
Hepatic Abscess	...	...	...	...	...	...	·06	...	...	...	...	·04	·02
Anæmia and Debility	...	...	...	...	...	·09	·11	·09	·11	...	·22	·13	·13
ALL CAUSES	2·33	4·96	5·42	6·76	7·81	7·42	8·85	5·20	5·22	9·37	9·30	9·89	7·41
V.—PERCENTAGE IN 100 ADMISSIONS—													
Influenza	...	...	...	·06	·03	·24	·29	·14	1·90	·19	·04	·17	·56
Cholera	...	...	·25	...	·44	·11	·14	...	·40	...	·42	·29	·20
Small-pox	...	...	...	...	·22	·15	·02	·07	·62	·13	·04	·03	·12
Enteric Fever	...	·32	...	·18	·03	·74	·38	·17	·50	·25	·08	·59	·41
Malaria	20·66	34·83	50·61	32·88	41·78	47·50	48·79	42·04	22·03	32·65	27·74	37·82	39·47
Malta Fever	...	...	...	...	...	·10	·01	·04	...	...	...	·02	·03
Pyrexia of uncertain origin	17·84	·54	1·11	3·52	1·25	3·19	·70	·37	4·77	1·40	3·16	3·02	2·48
Plague	...	·05	...	...	...	·01	...	...	·28	·13	·39	·02	·04
Tubercle of the lungs	·25	·16	...	·74	·92	·42	·35	·43	·28	·32	·35	·63	·44
Pneumonia	·37	·96	·98	1·36	2·30	·00	1·91	1·79	1·36	·64	1·39	2·48	1·90
Respiratory Diseases	4·43	3·11	2·95	4·07	1·86	1·66	2·04	2·64	3·39	7·83	3·05	3·97	3·00
Dysentery	13·16	3·43	3·81	11·10	9·18	5·61	4·78	3·49	6·32	7·64	6·25	5·11	5·86
Diarrhœa	·49	2·73	2·21	·31	·36	·71	1·23	1·01	1·11	1·85	1·23	1·88	1·30
Hepatic { Abscess / Congestion and Inflammation	·12	...	...	·31	·06	·11	·07	·07	·15	·19	·08	·18	·11
Scurvy	...	...	...	1·05	·14	·07	·20	·36	·12	·70	...	·33	·22
Venereal Diseases	2·09	2·04	2·70	2·18	2·52	1·98	·78	2·48	4·88	5·79	4·63	2·19	2·26
VI.—PERCENTAGE IN 100 DEATHS—													
Cholera	...	...	4·0·0	...	17·6	8·2	15·9	16·6	15·2	...	20·9	14·2	12·33
Small pox	...	...	...	...	...	·6	...	1·6	1·1	...	...	...	·32
Enteric Fever	...	...	...	...	...	13·2	5·7	11·4	8·7	18·6	...	10·8	7·76
Malaria	...	28·6	20·0	6·7	10·6	7·5	7·6	14·4	3·3	25·0	...	9·5	7·86
Malta Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin	...	...	...	6·7	...	·6	1·9	...	1·1	...	2·3	1·7	1·17
Plague	...	7·1	...	...	...	...	...	...	6·5	6·3	14·0	...	1·49
Circulatory Diseases	...	7·1	...	...	...	3·1	·6	3·2	4·3	6·3	2·3	2·6	2·34
Tubercle of the lungs	...	...	...	26·7	4·3	5·0	1·3	7·9	2·2	...	7·0	8·6	5·63
Pneumonia	...	50·0	40·0	33·3	42·6	37·1	43·9	28·6	15·2	18·6	16·3	25·9	29·65
Respiratory Diseases	...	...	...	20·0	...	5·0	2·5	3·2	3·3	6·3	9·3	4·7	3·93
Dysentery	33·3	...	...	...	...	1·9	2·5	4·8	4·3	12·5	9·3	1·7	2·98
Diarrhœa	...	...	...	...	...	·6	...	3·2	...	...	...	1·7	·85
Hepatic Abscess	...	...	...	...	...	...	·6	...	...	...	...	·4	·21
Anæmia and Debility	...	...	...	...	...	1·3	1·3	1·6	2·2	...	2·3	1·3	1·70

* Including Group Extra India.

TABLE XIII.—SICKNESS AND MORTALITY IN PLAINS AND HILLS—(1—ACTUALS 2—RATIOS.)

	C. Plains and Hills.	Average annual strength.	Malaria.		Tubercle of the lungs.		Pneumonia.		Other respiratory diseases.		Dysentery and Diarrhœa.		Scurvy.		Anæmia and Debility.		All causes.		Average number constantly sick.
			A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	
1904.	Plains ...	98,489	17,787	185	340	25	1,048	190	1,924	23	3,476	20	324	1	1,283	12	56,276	692	2,151
			181·0	·87	3·5	·25	10·7	1·93	19·6	·23	35·4	·20	3·3	·01	13·1	·12	572·6	7·04	21·9
	Hills ...	20,366	4,816	30	125	30	318	50	428	4	702	8	83	1	254	...	13,377	180	576
			236·5	1·47	6·1	1·47	15·6	2·46	20·9	·20	34·5	·39	4·1	·05	12·4	...	656·8	8·84	28·3
	Hills above 5,000 feet sea-level.	8,576	1,523	14	49	12	103	13	165	3	269	1	35	1	81	...	5,055	72	227
			167·6	1·64	5·7	1·40	12·0	1·52	19·2	·35	31·4	·12	4·1	·12	9·4	...	589·4	8·40	26·5
	Hills below 5,000 feet sea-level.	11,790	3,293	16	76	18	215	37	261	1	433	7	48	...	171	...	8,322	108	349
			277·0	1·45	6·4	1·53	18·2	3·14	22·1	·08	36·7	·59	4·1	...	14·5	...	705·9	9·16	29·6
1905.	Plains ...	99,771	15,130	99	287	33	1,266	185	2,528	23	3,771	18	124	3	1,080	9	55,250	602	2,083
			151·6	·69	2·9	·33	12·7	1·86	25·3	·21	37·8	·18	1·2	·03	10·8	·09	553·8	6·03	20·9
	Hills ...	20,284	3,677	26	93	26	277	50	920	5	850	9	84	1	253	...	14,749	365	624
			181·8	1·29	4·6	1·29	13·7	2·37	45·5	·35	42·0	·45	4·2	·05	12·5	...	729·3	18·05	30·9
	Hills above 5,000 feet sea-level.	9,583	1,357	11	46	13	95	20	333	2	341	6	50	1	100	...	5,698	260	266
			141·6	1·15	4·8	1·36	9·9	2·09	34·7	·21	35·6	·63	5·2	·10	10·4	...	594·6	27·13	27·1
	Hills below 5,000 feet sea-level.	10,641	2,320	15	47	13	182	30	587	3	509	3	34	...	153	...	9,651	105	364
			218·1	1·41	4·4	1·22	17·1	2·63	55·2	·47	47·8	·28	3·2	....	14·4	...	850·6	9·87	34·2
1906.	Plains ...	1,01,783	26,833	64	221	32	856	159	2,108	14	4,656	27	214	10	1,349	3	68,275	665	2,201
			263·7	·62	2·2	·31	8·4	1·56	20·7	·14	45·7	·27	2·1	·10	13·2	·03	670·8	6·53	21·6
	Hills ...	22,869	6,259	16	79	29	285	39	754	2	926	8	92	...	347	2	17,057	158	646
			278·2	·71	3·5	1·29	12·7	1·74	33·6	·09	41·2	·36	4·1	...	15·4	·09	759·1	7·03	28·8
	Hills above 5,000 feet sea-level.	11,510	2,546	8	34	9	118	17	289	2	437	7	70	...	163	2	6,923	78	293
			221·2	·69	3·0	·78	10·3	1·48	25·1	·17	38·0	·61	6·1	...	14·2	·17	601·5	6·78	25·5
	Hills below 5,000 feet sea-level.	10,959	3,704	8	45	20	167	22	465	...	489	1	22	....	184	...	10,134	80	353
			338·0	·72	4·1	1·82	15·2	2·01	42·4	...	44·6	·09	2·0	....	16·8	...	924·7	7·30	32·2
1907.	Plains ...	99,460	22,265	50	218	25	1,171	185	2,464	19	3,802	17	223	14	1,168	6	61,973	582	2,047
			224·1	·50	2·2	·25	11·8	1·86	24·8	·19	38·2	·17	2·2	·14	11·8	·06	623·2	5·85	20·6
	Hills ...	22,399	5,155	32	52	13	379	66	660	6	982	8	58	2	338	3	14,412	187	568
			230·2	1·43	2·3	·58	16·9	2·95	29·5	·27	43·8	·36	2·4	·09	15·1	·13	643·4	8·35	25·4
	Hills above 5,000 feet sea-level.	11,378	1,292	8	22	7	152	16	231	3	501	4	42	2	129	...	5,499	59	230
			113·5	·71	1·9	·62	13·4	1·41	20·3	·26	44·6	·35	3·7	·18	11·3	...	483·3	5·19	20·2
	Hills below 5,000 feet sea-level.	11,021	3,863	24	30	6	227	50	429	3	481	4	12	...	209	3	8,913	128	338
			350·5	2·18	2·7	·54	20·6	4·54	38·9	·27	43·6	·36	1·1	...	19·0	·27	808·7	11·61	·07
1908.	Plains ...	98,138	27,893	51	272	32	1,210	214	1,720	26	4,724	28	140	...	1,144	12	69,837	653	2,204
			284·2	·52	2·8	·33	12·3	2·18	17·5	·26	48·1	·29	1·4	...	11·7	·12	691·2	6·65	22·4
	Hills ...	23,465	5,545	22	92	20	364	60	582	11	1,054	8	48	...	352	3	14,660	232	550
			236·3	·94	3·9	·85	15·5	2·56	24·8	·47	44·9	·34	2·0	...	15·0	...	624·8	9·89	23·4
	Hills above 5,000 feet sea-level.	12,679	1,757	7	60	13	167	29	263	6	581	5	19	...	145	1	5,914	101	218
			145·5	·58	5·0	1·08	13·8	2·40	21·8	·50	48·1	·41	1·6	...	12·0	·08	489·6	8·36	18·0
	Hills below 5,000 feet sea-level.	11,386	3,788	15	32	7	197	31	319	5	473	3	29	...	207	2	8,746	131	332
			332·7	1·32	2·8	·61	17·3	2·72	28·0	·44	41·5	·26	2·5	...	18·2	·18	768·1	11·51	29·2

TABLE XIV.—SUMMARY, SICKNESS AND MORTALITY.

A.—Administrations.	Years.	Average strength.‡	RATIO PER MILLE OF STRENGTH *. Admissions.	Constantly sick.	Deaths from Cholera.	Small-pox.	Malaria.	Tubercle of the lungs.	Pneumonia.	Respiratory diseases.	Dysentery.	Diarrhœa.	Anæmia and debility.	All causes.
Burma	1901-1905	12,779	452	22	·68	·02	·61	·63	1·32	·51	2·77	·82	·32	8·78
	1907	13,721	256	14	·22	...	·37	3·06	·80	·44	·73	·29	·22	11·88
	1908	13,871	277	16	·79	...	·50	3·39	1·23	·43	1·37	·14	·14	13·27
Eastern Bengal and Assam ...	1901-1905	6,285	1,099	45	·67	·10	2·23	3·34	3·47	·76	7·67	1·05	1·46	28·07
	1907	7,316	861	38	·96	·14	2·60	3·97	3·27	·96	7·35	1·23	·68	29·35
	1908	7,118	917	32	1·92	·14	1·96	4·30	3·23	1·97	8·43	1·46	1·26	31·89
Bengal	1901-1905	14,573	999	37	·77	·04	2·03	3·85	2·48	·54	5·83	1·30	·56	23·03
	1907	14,108	938	36	·35	·28	1·04	3·12	2·64	·62	2·85	·35	·42	16·04
	1908	15,565	930	38	3·98	·06	·84	5·01	3·31	·45	8·54	1·80	·96	31·01
United Provinces of Agra and Oudh ...	1901-1905	25,557	609	34	·46	·04	·96	3·97	2·54	·94	3·73	1·06	·22	18·77
	1907	23,887	603	29	·04	·04	·88	1·67	3·43	·96	1·93	1·05	·17	15·03
	1908	28,308	679	31	·21	·32	1·55	2·79	4·91	1·28	3·89	1·27	·46	24·09
Punjab	1901-1905	12,333	599	33	·11	·10	·97	3·68	4·74	·66	2·61	·75	·68	21·68
	1907	11,154	703	30	...	...	·72	3·86	4·03	·54	2·06	1·24	·60	19·81
	1908	11,919	581	26	·08	·17	·42	5·87	4·53	·84	3·78	1·09	·42	23·49
North-West Frontier Province ...	1901-1905	1,287	1,016	33	...	·78	·62	·93	4·35	·47	3·73	·47	·31	20·38
	1907	1,183	1,309	39	...	...	...	3·38	5·92	...	3·38	·85	...	17·75
	1908	1,345	1,222	37	...	...	1·49	·74	4·46	2·23	·74	...	...	13·61
Central Provinces ...	1901-1905	4,129	772	25	·09	...	·56	2·53	2·48	1·31	3·62	1·85	1·17	20·19
	1907	3,241	526	18	...	...	1·24	2·47	·93	·62	4·32	·62	·93	19·44
	1908	4,012	632	21	...	·50	1·69	3·99	1·00	1·50	5·23	·50	...	22·18
Bombay	1901-1905	8,728	689	20	·05	·10	1·40	3·32	6·56	1·60	1·74	1·63	·83	26·36
	1907	7,537	693	22	...	...	·53	2·52	5·84	1·46	1·86	1·59	·93	20·96
	1908	7,930	654	33	·13	...	1·26	3·03	3·28	1·13	·88	·63	·25	18·16
Madras	1901-1905	9,832	482	21	1·36	·02	1·04	3·50	1·95	·33	2·36	·14	·37	18·74
	1907	10,166	376	19	3·84	...	1·18	2·46	1·87	·20	1·85	·10	·33	18·79
	1908	10,638	443	23	7·05	...	1·03	3·20	3·88	·75	7·05	...	·94	29·80
INDIA†	1901-1905	95,479	759	31	·54	·06	1·17	3·32	3·07	·70	3·71	1·04	·86	22·12
	1907	93,264	624	27	·59	·06	·96	2·74	2·90	·73	2·57	·80	·45	17·72
	1908	101,336	646	29	1·68	·15	1·04	3·76	3·24	1·03	4·67	·94	·55	24·77
ANDAMANS	1901-1905	13,289	3,838	61	...	...	3·76	7·66	4·23	1·28	10·84	1·57	·02	37·83
	1907	14,411	1,903	78	·07	...	2·23	5·20	4·30	·90	3·12	·60	...	23·59
	1908	14,067	1,439	79	...	...	2·20	7·11	4·12	1·07	4·34	·71	...	26·66
INDIA§	1901-1905	108,769	891	35	·47	·06	1·53	3·85	3·21	·85	4·58	1·12	·49	23·11
	1907	107,675	795	34	·52	·06	1·01	3·07	3·08	·75	3·65	·79	·30	18·51
	1908	115,403	743	35	1·47	·13	1·18	4·17	3·34	1·03	4·63	·91	·49	24·47

* Excluding Subsidiary Jails. † Including Ajmer, Sibi, Quetta, Mercara and Secunderabad and excluding Andamans. § Including Andamans.

B.—Geographical Groups.	Years.	Average strength.‡	RATIO PER MILLE OF STRENGTH *. Admissions.	Constantly sick.	Deaths from Influenza.	Cholera.	Small-pox.	Enteric fever.	Malaria.	Pyrexia of uncertain origin.	Pneumonia.	Dysentery.	Diarrhœa.
Group I.—Burma Coast and Bay Islands ...	1901-1905	7,967	442	21	·8	1·2	·1	...	100·2	19·2	3·8	37·0	25·2
	1907	9,728	248	14	·8	·5	·1	...	35·6	17·1	1·3	10·6	6·6
	1908	9,542	271	15	·6	·3	...	·8	33·4	16·8	2·0	14·0	11·8
,, II.—Burma Inland ...	1901-1905	3,812	471	23	4·2	1·8	·1	·6	110·2	3·0	8·6	69·7	30·1
	1907	3,993	274	14	...	...	·3	·3	39·6	6·3	4·8	43·1	8·5
	1908	4,329	291	16	...	3·2	...	3·0	40·4	15·7	7·9	31·2	11·1
,, III.—Assam	1901-1905	1,239	820	42	10·8	1·5	1·1	·8	263·9	4·4	4·8	234·2	56·4
	1907	1,545	866	28	89·3	...	...	·6	338·8	...	5·2	273·5	53·7
	1908	1,532	1,138	27	...	1·6	·2	...	627·3	...	7·8	91·4	92·7
,, IV.—Bengal and Orissa ...	1901-1905	12,182	1,014	40	21·3	1·1	·4	·5	272·4	10·8	10·3	258·9	76·3
	1907	12,670	946	41	10·0	1·4	·9	·2	305·4	1·7	11·0	191·2	83·9
	1908	12,984	957	42	88·0	5·5	·5	3·1	251·5	5·6	9·9	196·0	89·3
,, V.—Gangetic Plain and Chutia Nagpur	1901-1905	23,686	569	33	16·0	·9	·4	·4	266·5	4·5	10·0	86·0	50·7
	1907	22,646	622	26	2·0	·4	1·9	·2	304·0	6·0	9·8	64·9	30·6
	1908	26,317	661	29	385	3·0	2·6	·2	204·8	11·3	11·7	86·8	40·2
,, VI.—Upper Sub-Himalaya ...	1901-1905	13,091	546	32	17·8	·1	·3	·8	410·5	3·9	17·5	56·3	54·5
	1907	11,886	752	31	7·2	·1	·6	1·0	290·9	2·1	11·4	34·3	27·5
	1908	13,349	272	30	7·3	·1	2·1	·9	361·6	7·6	25·7	23·0	23·8
,, VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1901-1905	8,142	785	29	9·5	·3	1·7	·2	202·4	1·1	27·4	48·5	49·1
	1907	7,958	738	31	1·0	...	...	·9	232·3	1·5	31·7	52·5	46·9
	1908	8,493	650	28	1·0	·5	1·0	·5	203·9	4·2	29·7	47·8	31·4
,, VIII.—South-Western Rajputana, Central India and Gujarat.	1901-1905	4,772	754	39	12·3	·5	·8	...	279·0	·3	20·5	36·5	31·2
	1907	4,206	664	24	...	...	...	...	162·8	...	18·3	19·0	38·0
	1908	4,666	580	37	...	·2	·2	1·1	193·3	...	19·1	35·7	29·4
,, IX.—Deccan	1901-1905	8,373	812	31	14·0	·1	·3	·2	290·4	4·5	9·9	50·3	44·5
	1907	6,563	727	29	5·2	·2	·2	·6	215·7	·6	3·7	46·8	38·7
	1908	7,557	744	32	2·5	·8	·7	·5	210·3	9·0	4·2	50·8	49·4
,, X.—Western Coast ...	1901-1905	2,728	539	23	1·4	·1	1·9	3·7	159·9	8·3	9·5	40·8	38·8
	1907	2,200	479	23	·4	...	...	11·4	96·9	5·2	7·0	75·1	40·2
	1908	2,400	530	25	...	...	1·2	3·8	109·2	8·3	6·7	80·0	30·4
,, XI.—Southern India ...	1901-1905	8,815	497	22	4·4	3·6	·2	·7	107·7	26·8	9·0	55·1	5·8
	1907	9,195	376	19	...	11·6	·1	·5	55·9	8·2	4·6	51·3	3·5
	1908	9,036	433	23	·1	13·0	·1	1·2	69·1	13·4	8·5	58·7	5·9
,, XII.—Hills	1901-1905	504	842	28	5·1	1·3	1·0	2·4	270·0	19·9	26·2	85·5	50·5
	1907	608	671	25	...	...	...	1·6	210·6	3·3	11·5	65·8	41·1
	1908	656	868	27	...	40·5	...	...	184·7	...	16·5	91·6	61·6
INDIA†	1901-1905	95,479	759	31	12·7	1·0	·5	·6	254·0	8·1	10·4	88·3	45·8
	1907	93,264	628	27	4·9	1·3	·7	·7	191·3	5·1	11·5	69·9	36·4
	1908	101,336	646	29	4·2	3·3	1·2	1·1	199·7	9·4	13·4	76·9	37·6
ANDAMANS ...	1901-1905	13,289	3,838	61	7·0	...	...	...	1,121·4	...	11·6	156·0	63·9
	1907	14,411	1,903	78	1·1	·1	...	...	1,419·6	22·6	13·9	109·8	21·2
	1908	14,067	1,439	79	...	...	...	·2	856·5	9·5	10·2	110·8	25·5
INDIA§	1901-1905	108,769	891	35	12·0	·9	·4	·5	360·0	7·8	12·3	26·7	48·0
	1907	107,675	795	34	4·4	1·2	·6	·6	342·3	7·5	13·8	73·5	34·0
	1908	115,403	743	35	3·7	2·9	1·1	1·0	278·0	9·4	13·1	81·1	37·3

TABLE XV.—RATIOS OF ADMINISTRATIONS.

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.										
	Burma.	Eastern Bengal and Assam.	Bengal.	United Provinces.	Punjab.	N.-W.F. Province.	Central Provinces.	Bombay.	Madras.	India.*	Andamans.	India.†
I.—AVERAGE ANNUAL STRENGTH	13,871	7,118	15,563	28,308	11,919	1,345	4,013	7,930	10,638	101,316	14,062	115,493
II.—CONSTANTLY SICK RATE OF EACH MONTH—												
January	13·6	27·4	33·4	31·5	28·2	33·0	16·2	32·6	20·0	26·7	79·8	33·6
February	14·2	25·6	31·7	26·6	24·9	20·8	16·4	35·1	18·7	24·9	77·5	31·6
March	15·6	32·8	34·1	26·9	22·7	23·3	18·8	36·6	20·1	26·0	73·9	32·3
April	14·0	30·4	30·6	28·9	22·3	29·6	18·3	33·1	17·9	26·5	76·9	32·6
May	13·9	31·6	38·1	28·4	21·1	24·4	18·4	31·1	20·2	26·4	83·7	33·4
June	14·9	36·5	35·8	28·0	21·8	30·5	20·1	29·5	23·4	26·9	82·7	34·2
July	17·4	41·1	44·9	27·9	24·1	30·3	17·4	35·0	24·9	29·0	89·6	36·2
August	17·3	39·7	44·3	29·5	23·5	31·2	21·8	34·2	29·6	30·2	78·4	35·8
September	15·1	42·4	39·4	32·9	30·8	47·9	27·6	32·0	25·2	31·9	73·6	36·0
October	15·3	45·1	40·1	35·9	32·9	67·8	27·8	30·1	27·9	33·0	74·0	37·8
November	17·9	40·7	38·6	38·3	35·1	60·5	25·4	29·6	23·8	31·8	72·9	37·3
December	16·4	36·3	37·9	35·1	28·0	39·8	21·7	30·6	23·7	30·1	73·4	35·7
OF THE YEAR	15·5	36·6	38·4	30·9	26·1	37·1	21·0	32·5	22·9	28·7	78·6	34·7
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	34·6	36·7	...	25·8	28·0	20·9	30·1	21·5	27·9	...	33·8
III.—ADMISSION RATE OF THE YEAR—												
Influenza	·4	32·7	·2	4·7	2·8	1·5	4·7	...	·1	4·2	...	3·7
Cholera	4·2	2·1	8·4	·6	·4	...	...	·1	14·3	3·3	...	2·9
Small-pox	...	·3	1·3	2·6	1·3	...	·7	·6	·2	1·2	...	1·1
Enteric Fever	1·5	4·2	1·0	·3	·9	·7	·2	·4	2·0	1·1	·2	1·0
Malaria	35·6	283·4	247·7	281·3	164·4	692·9	239·5	125·7	74·9	197·7	856·5	278·0
Pyrexia of uncertain origin	16·4	5·9	3·1	9·9	9·1	...	11·0	6·9	13·4	9·4	9·5	9·4
Tubercle of the lungs	7·6	10·5	12·8	8·2	13·0	6·7	10·0	6·6	7·7	9·4	10·3	9·5
Pneumonia	3·6	11·5	8·5	18·2	15·9	24·5	5·0	17·2	8·4	12·4	10·2	12·3
Respiratory Diseases	9·2	26·8	27·8	21·4	27·5	30·5	17·4	43·0	20·9	23·3	45·1	26·0
Dysentery	19·4	201·3	181·7	46·6	49·2	76·6	41·1	46·7	64·1	76·9	110·8	81·1
Diarrhœa	11·6	72·5	95·8	23·1	32·0	17·8	28·4	47·8	7·0	37·6	35·5	37·3
Spleen Diseases	·1	...	·6	·2	·7	5·9	...	2·8	...	·6	·2	·5
Scurvy	·2	·8	1·1	·1	·1	3·0	·2	4·2	·2	·7	2·2	·9
Anæmia and Debility	1·9	18·8	13·7	10·2	13·2	15·6	12·5	10·5	20·4	11·8	·4	10·4
Abscess, Ulcer, and Boil	39·1	43·0	57·4	84·2	81·5	155·4	65·0	85·5	28·6	65·2	99·9	69·4
ALL CAUSES	276·8	917·1	930·0	678·9	581·2	1,221·6	632·2	653·6	442·5	645·9	1,438·5	742·5
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	892·5	903·6	...	582·3	1,267·9	632·0	648·1	528·7	651·1	...	741·4
IV.—DEATH RATE OF THE YEAR—												
Cholera	·79	1·97	3·98	·21	·08	...	...	·13	7·05	1·68	...	1·47
Small-pox	...	·14	·06	·32	·17	...	·50	...	...	·15	...	·13
Enteric Fever	·22	1·40	·32	·07	·34	·74	·25	·13	·85	·36	...	·38
Malaria	·50	1·26	·84	1·55	·42	1·49	1·00	1·26	1·03	1·04	2·20	1·18
Pyrexia of uncertain origin	...	...	·13	...	...	...	...	...	...	·02	...	·02
Tubercle of the lungs	3·39	4·50	5·01	2·79	5·87	·74	3·99	3·03	3·20	3·76	7·11	4·17
Pneumonia	1·23	3·23	2·31	4·91	4·53	4·46	1·00	3·28	1·88	3·24	4·12	3·31
Respiratory Diseases	·43	1·97	·45	1·38	·84	2·23	1·50	1·13	·75	1·03	1·07	1·03
Dysentery	1·37	8·43	8·54	3·89	3·78	·74	5·23	·88	7·05	4·67	4·34	4·63
Diarrhœa	·14	1·26	1·80	1·27	1·09	...	·50	·63	...	·94	·71	·91
Hepatic Abscess	·22	...	·13	·11	·08	...	...	...	·09	·10	...	·09
Anæmia and Debility	·14	1·26	·96	·46	·42	...	...	·25	·94	·55	...	·49
Phagedæna, Slough, and Gangrene	...	...	...	·07	...	...	·50	...	...	·04	·14	·05
ALL CAUSES	13·27	31·89	31·61	24·09	23·49	15·61	22·18	18·16	29·80	24·17	26·66	24·42
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	31·29	31·19	...	23·44	15·04	22·16	17·37	29·28	24·09	...	24·32
V.—PERCENTAGE IN 100 ADMISSIONS—												
Influenza	·16	3·57	·02	·69	·48	·12	·75	...	·02	·66	...	·38
Cholera	·44	·23	·90	·09	·07	...	...	·02	3·23	·51	...	·38
Small-pox	...	·06	·14	·30	·23	...	·12	·10	·04	·19	...	·14
Enteric Fever	·55	·46	·11	·05	·16	·06	·04	·06	·45	·17	·01	·14
Malaria	12·88	30·90	26·64	41·44	28·30	55·08	37·88	19·24	16·46	30·62	59·54	37·46
Pyrexia of uncertain origin	5·94	·64	·37	1·44	1·57	...	1·73	1·06	3·04	1·46	·66	1·28
Tubercle of the lungs	2·76	1·15	1·38	1·20	2·24	·55	1·58	1·00	1·74	1·45	·73	1·28
Pneumonia	1·30	1·26	·92	2·69	2·74	2·01	·79	2·62	1·89	1·92	·71	1·84
Respiratory Diseases	3·33	2·93	2·98	3·15	4·74	2·50	2·76	6·58	4·72	3·61	3·14	3·59
Dysentery	7·01	21·95	19·54	6·86	8·46	6·27	7·13	7·14	14·49	11·91	7·70	10·98
Diarrhœa	4·19	7·90	10·30	3·41	5·51	1·46	4·49	7·31	1·57	5·81	2·47	5·05
Spleen Diseases	·03	...	·06	·03	·12	·49	...	·42	...	·09	·08	·10
Scurvy	·08	·09	·12	·01	·01	·24	·04	·64	·04	·11	·15	·13
Anæmia and Debility	·70	2·05	1·48	1·59	2·27	1·28	3·07	1·58	4·61	1·82	·02	1·69
Abscess, Ulcer, and Boil	14·14	4·69	6·17	12·38	14·02	12·72	10·46	13·08	6·46	10·09	6·94	9·73
VI.—PERCENTAGE IN 100 DEATHS—												
Cholera	6·0	6·2	12·6	·3	·4	...	...	·7	23·7	6·9	...	6·2
Small-pox	...	·4	·2	1·3	·7	...	2·2	...	...	·6	...	·5
Enteric Fever	1·6	4·4	1·0	1·3	1·4	4·8	1·1	·7	2·8	1·3	...	1·5
Malaria	3·8	4·0	2·6	6·3	1·8	9·5	4·5	6·9	3·5	4·3	8·3	4·7
Pyrexia of uncertain origin	...	...	·4	...	...	...	...	...	...	·1	...	·1
Tubercle of the lungs	25·5	14·1	15·9	11·6	25·0	4·8	18·0	16·7	10·7	15·6	26·7	16·2
Pneumonia	9·2	10·1	7·3	20·4	10·3	28·6	4·5	18·1	6·3	13·4	15·5	13·5
Respiratory Diseases	3·3	6·2	1·4	5·7	3·6	14·3	6·7	6·2	2·5	4·2	4·0	4·3
Dysentery	10·3	26·4	27·0	16·1	16·1	4·8	23·6	4·9	23·7	19·3	16·3	18·9
Diarrhœa	1·1	4·0	5·7	5·3	4·6	...	2·2	3·5	...	3·9	2·7	3·7
Hepatic Abscess	1·6	...	·4	·4	·4	...	...	...	...	·4	...	·3
Anæmia and Debility	1·1	4·0	3·0	1·9	1·8	...	...	1·4	3·2	2·3	...	2·2
Phagedæna, Slough, and Gangrene	...	...	...	·3	...	...	2·2	...	...	·2	·5	·3

* Including Ajmer, Sibi, Quetta, Secunderabad, Mercara and excluding Andamans.

† Including Ajmer, Sibi, Quetta, Secunderabad, Mercara and Andamans.

TABLE XVI.—RATIOS OF GEOGRAPHICAL GROUPS.

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat	IX Deccan	X Western Coast.	XI Southern India.	XII Hills.	India*.
—AVERAGE ANNUAL STRENGTH	9,542	4,329	1,532	12,984	26,317	13,349	8,293	4,666	7,557	2,400	9,636	666	100,336
—CONSTANTLY SICK RATE OF EACH MONTH.													
January	13·9	12·9	20·8	35·6	27·9	30·5	27·2	38·5	30·7	21·3	20·4	18·4	26·7
February	14·3	14·9	18·0	33·0	25·4	25·9	25·0	36·3	31·5	22·8	19·1	18·3	24·9
March	15·3	16·7	18·8	36·2	22·7	25·0	36·0	33·4	28·6	20·0	16·9	20·0	26·0
April	13·7	14·9	22·5	39·5	23·0	27·6	35·2	31·1	31·2	17·9	20·1	20·5	26·5
May	13·6	14·6	23·3	40·5	24·4	24·8	32·4	30·1	22·5	20·4	23·0	26·4	
June	15·2	14·0	30·0	42·3	27·1	24·5	25·3	33·5	29·6	24·4	21·3	23·9	
July	18·4	14·9	45·5	46·4	29·1	24·2	25·4	30·7	32·7	27·7	21·8	33·2	29·0
August	17·6	16·6	33·2	46·9	30·1	26·4	27·5	34·0	32·9	28·4	29·5	31·0	30·2
September	14·4	16·5	26·6	45·6	28·8	36·6	31·3	42·8	34·3	23·8	25·3	33·3	31·6
October	13·7	18·7	29·0	48·2	32·4	40·5	32·2	42·8	33·5	26·1	26·4	34·5	33·0
November	16·8	20·3	27·5	43·4	32·0	47·3	32·6	40·8	31·1	27·2	22·6	26·4	32·8
December	16·9	15·4	22·8	39·7	30·0	37·1	31·1	41·5	30·4	21·1	23·2	39·6	30·1
OF THE YEAR	15·3	15·8	26·5	41·7	29·0	30·3	27·9	37·0	31·8	24·6	22·8	26·8	28·7
II.—ADMISSION RATE OF THE YEAR—													
Influenza	·6	...	...	18·0	2·5	7·3	1·0	...	2·5	...	·1	...	4·2
Cholera	·3	3·2	2·6	5·5	3·0	·1	·5	·2	·8	...	13·0	40·5	3·3
Small-pox	...	...	·7	·5	2·6	2·1	1·0	·2	·7	1·2	·2	...	1·2
Enteric Fever	·8	3·0	...	3·1	·2	·9	·5	1·1	·5	3·8	1·2	...	1·1
Malaria	33·4	40·4	627·3	251·5	204·8	351·6	203·9	193·3	210·3	109·2	60·1	184·7	197·7
Pyrexia of uncertain origin	16·8	15·7	...	5·6	11·3	7·6	4·2	...	9·0	8·3	13·4	...	9·4
Tubercle of the lungs	7·5	7·9	3·9	13·2	8·9	9·3	12·5	7·7	8·7	7·5	8·1	10·5	9·4
Pneumonia	2·0	7·2	7·8	9·9	11·7	25·7	22·7	19·1	4·2	6·7	8·5	16·5	12·4
Respiratory Diseases	9·3	9·6	18·3	30·4	19·2	21·4	42·3	32·8	22·8	49·6	18·5	75·1	23·3
Dysentery	14·0	31·2	91·4	196·0	86·8	62·0	47·8	25·7	50·8	80·0	58·7	91·6	76·9
Diarrhœa	11·8	11·1	92·7	89·3	40·2	25·8	31·4	29·4	49·4	30·4	5·9	61·6	37·6
Spleen Diseases	·1	...	...	6	·2	·2	1·9	·2	2·1	8	...	6·0	·6
Scurvy	·3	...	...	1·7	·0	...	·1	·4	·5	...	·2	1·5	·2
Anæmia and Debility	1·4	3·2	20·2	16·2	12·3	10·5	11·0	10·1	10·7	17·9	19·3	27·0	11·8
Abscess, Ulcer, and Boil	37·6	42·5	53·5	53·8	74·2	82·3	85·3	81·7	96·1	35·4	28·3	85·6	65·2
ALL CAUSES	270·5	290·8	1138·4	956·6	660·9	771·4	610·3	580·1	744·3	530·0	432·9	867·9	645·9
V.—DEATH RATE OF THE YEAR—													
Cholera	·10	2·31	2·61	2·62	1·44	·07	·12	·21	·66	...	5·81	28·53	1·68
Small-pox	...	...	·65	...	·19	·45	·12	...	·26	...	...	...	·30
Enteric Fever	·21	·23	...	·92	·11	·22	·36	·21	·26	1·67	·52	...	·36
Malaria	·63	·23	1·96	·85	1·51	·82	1·33	·43	·79	2·50	·42	4·50	1·04
Pyrexia of uncertain origin	...	...	...	·08	·04	...	...	...	...	...	...	...	·02
Tubercle of the lungs	3·56	3·00	1·96	4·85	3·63	3·52	4·82	2·79	3·91	3·75	3·32	6·01	3·76
Pneumonia	·73	2·31	2·61	2·85	3·12	7·28	4·46	4·71	3·66	1·25	1·97	3·00	3·24
Respiratory Diseases	·31	·69	...	1·31	1·25	·97	1·93	·64	1·72	·42	·31	1·50	1·03
Dysentery	1·15	1·85	7·18	8·09	5·40	4·49	2·89	2·79	3·31	·83	6·54	21·02	4·67
Diarrhœa	·10	·23	·65	1·31	1·44	1·27	·96	1·50	·26	·83	...	1·50	·94
Hepatic Abscess	·21	·23	...	·08	·11	·15	...	...	...	...	·10	...	·10
Anæmia and Debility	·10	·23	2·61	1·00	·72	·22	·24	·21	·13	·42	·73	4·50	·55
Phagedæna, Slough, and Gangrene	...	...	...	...	·08	...	...	...	·26	...	...	...	·04
ALL CAUSES	11·11	18·02	26·76	29·57	27·36	24·72	23·15	19·29	19·32	17·92	27·09	87·09	24·17
V.—PERCENTAGE IN 100 ADMISSIONS—													
Influenza	·33	...	...	1·89	·37	·94	·15	...	·34	...	·02	...	·60
Cholera	·12	1·11	·23	·58	·45	·02	·07	·04	·11	...	3·00	4·67	·52
Small-pox	...	...	·06	·06	·39	·27	·15	·04	·09	·24	·05	...	·19
Enteric Fever	·31	1·03	...	·32	·03	·12	·07	·18	·07	·71	·20	...	·17
Malaria	12·36	13·90	55·10	26·29	30·98	45·58	31·36	33·31	28·25	20·60	15·97	21·28	30·62
Pyrexia of uncertain origin	6·20	5·40	...	·59	1·71	1·00	·65	...	1·21	1·57	3·19	...	1·48
Tubercle of the lungs	2·79	2·70	·34	1·38	1·35	1·20	1·93	1·33	1·17	1·42	1·87	1·81	1·45
Pneumonia	·74	2·46	·69	1·04	1·76	3·33	3·49	3·29	·57	1·26	1·97	1·90	1·92
Respiratory Diseases	3·45	3·19	1·61	3·18	2·91	2·78	6·51	5·65	3·06	9·36	4·27	8·65	3·61
Dysentery	5·19	10·72	8·03	20·58	13·13	8·03	7·34	4·43	6·38	15·09	13·57	10·55	11·91
Diarrhœa	4·38	3·81	8·14	9·33	6·08	3·35	4·82	5·06	6·63	5·74	1·37	7·09	5·84
Spleen Diseases	·04	...	...	·06	·03	·03	·30	·04	·28	·16	...	·69	·09
Scurvy	·12	...	...	·18	·01	...	·03	·07	·07	...	·05	·17	·11
Anæmia and Debility	·50	1·11	1·78	1·67	1·87	1·33	1·69	1·74	1·44	3·38	4·46	3·11	1·82
Abscess, Ulcer, and Boil	13·91	14·61	4·70	5·62	11·23	10·66	13·11	14·07	12·91	6·68	6·55	9·86	10·09
PERCENTAGE IN 100 DEATHS—													
Cholera	·9	12·8	9·8	8·9	5·3	·3	·5	1·1	3·4	...	21·5	32·8	6·9
Small-pox	...	...	2·4	...	·7	1·8	·5	...	1·4	...	...	...	·6
Enteric Fever	1·9	1·3	...	3·1	·4	·9	1·6	1·1	1·4	9·3	1·9	...	1·5
Malaria	5·7	1·3	7·3	2·9	5·7	3·3	5·7	2·2	4·1	14·0	1·5	5·2	4·3
Pyrexia of uncertain origin	...	...	...	·3	·1	...	...	...	...	...	...	...	·1
Tubercle of the lungs	32·1	16·7	7·3	16·4	13·3	14·2	20·8	14·4	19·2	20·9	11·9	6·9	15·6
Pneumonia	6·6	12·8	9·8	9·6	11·4	29·4	19·3	24·4	9·5	7·0	7·3	3·4	13·4
Respiratory Diseases	2·8	3·8	...	4·4	4·6	3·9	4·7	3·3	8·9	2·3	3·1	1·7	4·2
Dysentery	10·4	10·2	26·8	27·3	19·7	18·2	9·9	14·4	17·1	4·7	24·1	24·1	19·3
Diarrhœa	·9	1·3	2·4	4·4	5·3	5·2	4·2	7·8	1·4	4·7	...	1·7	3·9
Hepatic Abscess	1·9	1·3	...	·3	·6	...	...	...	...	...	·4	...	·4
Anæmia and Debility	·9	1·3	2·8	3·4	2·6	·9	2·0	1·2	2·7	2·3	2·7	5·2	2·3
Phagedæna, Slough, and Gangrene	...	...	...	...	·3	...	...	...	1·4	...	...	...	·3

* Including Aden.

General Population.

Table XVII.—Provincial Birth and Death Statistics.

Province.	Year.	Births: Total number.	Births: Ratio per 1,000 of population.	Births: Mean ratio per 1,000 of population during previous five years.	Number of Deaths: In municipalities and towns.	Number of Deaths: In districts excluding towns.	Number of Deaths: Total.	Ratio of deaths per 1,000 of population: In municipalities and towns.	Ratio of deaths per 1,000 of population: In districts excluding towns.	Ratio of deaths per 1,000 of population: Total.	Highest death-rate: In municipalities and towns.	Highest death-rate: In districts excluding towns.	Lowest death-rate: In municipalities and towns.	Lowest death-rate: In districts excluding towns.	Mean death rate during previous five years: In municipalities and towns.	Mean death rate during previous five years: In districts excluding towns.	Mean death rate during previous five years: Total.	Number of deaths of males to every 100 deaths of females.
Bengal	1907	1,905,428	37·70	39·08	116,272	1,789,930	1,906,192	36·23	37·82	37·72	93·95	56·09	7·66	23·52	37·52	34·43	34·63	105
	1908	1,883,726	36·09	38·90	100,234	1,848,379	1,948,613	31·20	39·06	38·56	59·25	68·38	6·58	26·93	37·96	35·42	35·53	109
Eastern Bengal and Assam.	1907	2,103,593	37·01	39·31	14,417	859,333	873,752	8·67	29·45	29·30	43·85	43·89	8·01	21·55	24·99	32·35	32·19	110
	1908	2,226,602	41·14	38·56	14,137	902,469	916,606	22·83	30·98	30·74	57·26	51·37	8·22	20·10	24·58	32·78	32·60	111
United Provinces of Agra and Oudh.	1907	4,963,663	40·18	48·02	185,390	1,887,346	2,072,536	35·14	42·52	40·46	142·87	87·58	18·29	24·13	50·69	37·16	38·12	103·49
	1908	4,786,902	37·46	43·09	165,121	2,349,640	2,514,761	49·20	53·00	52·72	114·53	81·22	18·68	29·43	52·38	39·28	40·30	102·84
Punjab	1907	819,571	40·8	43·3	110,180	1,138,549	1,248,729	54·65	62·93	62·10	144·31	106·67	12·15	29·02	48·44	46·99	45·33	104·3
	1908	840,662	41·8	42·6	111,973	908,152	1,020,125	55·58	50·19	50·73	123·43	84·35	5·80	29·22	49·58	48·86	48·90	108·8
North-West Frontier Province.	1907	68,068	38·5	36·3	6,072	60,945	67,017	36·00	35·04	35·12	58·47	41·59	13·81	31·63	30·57	29·51	29·61	109·5
	1908	71,181	37·2	35·8	6,002	62,359	68,361	35·89	35·85	35·83	65·39	37·41	7·50	32·25	32·99	31·44	31·54	110·5
Central Provinces and Berar.	1907	633,529	51·46	50·47	55,478	440,135	495,693	45·11	41·30	41·70	93·28	59·58	19·51	32·11	40·62	37·14	35·81	108·13
	1908	633,575	52·84	51·26	46,867	410,514	457,681	37·74	38·16	38·12	70·55	49·59	18·14	32·60	49·35	36·57	37·91	110·05
Madras Presidency.	1907	1,119,170	30·8	30·6	121,281	761,735	883,016	28·5	23·7	24·3	66·4	37·1	4·5	17·0	29·3	21·9	22·7	103·6
	1908	1,192,236	32·4	31·1	137,891	823,668	960,919	32·3	25·2	26·2	70·8	37·8	2·8	13·8	29·4	22·8	23·6	104·5
Coorg	1907	4,304	43·83	34·76	672	5,677	6,349	44·01	34·34	35·15	68·64	44·23	31·50	27·01	38·65	27·15	28·12	119·25
	1908	4,365	34·27	34·75	767	5,544	6,311	50·20	33·53	34·04	83·12	38·85	27·50	28·22	40·08	28·79	29·74	124·21
Bombay Presidency	1907	610,532	33·03	33·47	99,880	506,726	606,606	38·19	31·54	32·82	82·36	56·81	40·85	13·29	55·33	35·68	38·25	107·23
	1908	660,801	35·72	33·25	99,804	402,334	502,138	37·50	25·10	27·15	59·29	38·07	8·08	12·29	50·92	34·82	37·00	108·93
Lower Burma	1907	181,834	32·65	32·99	30,183	119,289	149,472	42·18	24·58	26·84	65·10	31·88	15·93	17·01	34·70	22·39	23·92	491
	1908	189,669	34·06	33·12	30,207	126,052	156,259	42·36	25·94	28·06	75·90	33·18	20·18	18·74	36·49	23·33	25·06	126
Upper Burma	1907	96,659	33·14	...	13,087	65,153	78,240	39·82	24·39	26·13	47·75	38·85	17·14	17·75	37·57	19·47	21·53	101
	1908	105,960	36·32	...	12,795	70,405	83,200	38·80	27·21	28·54	61·31	43·85	19·60	18·10	39·45	21·17	23·09	102
Ajmer-Merwara	1907	14,881	31·20	33·06	5,288	8,843	14,131	40·79	25·46	29·63	61·02	43·01	25·52	17·42	42·79	26·38	31·13	106·96
	1908	20,261	42·48	32·09	6,819	12,178	19,063	52·60	35·34	40·03	90·37	55·23	36·77	23·89	42·77	25·90	30·49	103·68

General Population.

Table XVIII.—Births.

Province.	Population under registration.	Ratio of Births per 1,000 of population: Maximum for any one district.	Ratio of Births per 1,000 of population: Minimum for any one district.	Ratio of Births per 1,000 of population: Mean for the province.	Number of males born to every 100 females born.	Excess of births over deaths, per 1,000 of population.	Excess of deaths over births per 1,000 of population.
Bengal	50,528,446	44·68	20·10	36·09	105	...	2·47
Eastern Bengal and Assam ...	29,812,735	52·40	31·29	41·14	107	10·30	...
United Provinces of Agra and Oudh	47,691,782*	61·28	25·12	37·46	109·11	...	15·27
Punjab	20,105,690	74·3	19·7	41·8	109·7	...	8·9
North-West Frontier Province ...	1,908,184	40·8	35·1	37·3	123·6	1·3	...
Central Provinces and Berar ...	11,990,419	63·41	46·08	52·84	104·03	14·72	...
Madras Presidency	36,744,483	39·3	21·6	32·4	104·9	6·2	...
Coorg	180,607	37·04	17·44	24·17	101·43	...	10·77
Bombay Presidency	18,481,362	56·53	16·72	35·72	107·92	8·57	...
Burma ... { Lower	5,568,479	42·63	20·04	34·06	107	5	...
Burma ... { Upper	2,917,591	45·72	28·21	36·32	106	8	...
Ajmer-Merwara	476,912	54·13	39·02	42·48	114·67	2·45	...

*Includes 16,010 persons enumerated at the Ajodhya Fair.

General Population.

Table XIX.—Deaths.

Province.	Population under registration.	Area in square miles.	Average population per square mile.	Ratio of deaths per 1,000 of population.			Death rate by Sex	
				Maximum for any one district.	Minimum for any one district.	Mean for the province.	Male.	Female.
Bengal	50,528,446	110,469	457	67·44	26·44	38·56	40·61	36·54
Eastern Bengal and Assam	29,812,735	71,535	416	51·40	19·97	30·74	31·75	29·69
United Provinces of Agra and Oudh.	47,691,782*	107,164	445	78·02	27·71	52·73	51·79	53·73
Punjab	20,108,690	97,209	207	84·1	25·1	50·7	47·9	54·0
North-West Frontier Province.	1,908,184	13,688	149	37·7	31·6	35·8	35·3	36·5
Central Provinces and Berar.	11,990,419	100,396	119	42·40	32·42	38·12	40·34	35·94
Madras Presidency ...	36,744,483	129,241	284	44·1	15·6	26·2	27·1	25·2
Coorg	180,607	1,583	114	38·85	32·25	34·94	34·86	35·05
Bombay Presidency ...	18,481,362	122,984	150	39·47	16·39	27·15	27·56	26·83
Burma { Lower ...	5,568,479	76,992	72	41·58	20·69	28·06	29·54	26·39
Burma { Upper ...	2,917,501	29,411	99	43·26	18·76	28·52	30·26	26·95
Ajmer-Merwara ...	476,912	2,711	176	41·15	36·26	40·03	38·72	41·50

Table XX.—Deaths in Towns and Rural Circles compared.

Province.	Number of Registration Circles.			Population.			Ratio of Deaths per 1,000 of population.		
	Rural.	Town.	Total.	Rural.	Town.	Total.	Rural.	Town.	Total.
Bengal . . .	401	128	529	47,319,539	3,208,907	50,528,446	39·06	31·20	38·56
Eastern Bengal and Assam.	242	54	296	29,177,017	635,718	29,812,735	30·92	22·23	30·74
United Provinces of Agra and Oudh.	815	446	1,261	44,335,992*	3,355,790	47,691,782*	53·00	49·20	52·73
Punjab . . .	408	143	551	18,094,078	2,014,612	20,108,690	50·19	55·58	50·73
North-West Frontier Province.	65	11	76	1,739,531	168,653	1,908,184	35·85	35·59	35·83
Central Provinces and Berar.	321	105	426	10,756,551	1,233,868	11,990,419	38·16	37·74	38·12
Madras Presidency .	190	232	422	32,494,434	4,250,049	36,744,483	25·3	32·3	26·2
Coorg . . .	5	5	10	165,358	15,249	180,607	33·53	50·30	34·94
Bombay Presidency .	224	65	289	16,027,955	2,053,369	18,481,362†	25·10	37·50	27·15
Burma { Lower .	219	39	258	4,858,774	709,705	5,568,479	25·34	42·56	28·06
Burma { Upper .	113	17	130	2,587,732	329,769	2,917,501	27·21	38·80	28·52
Ajmer-Merwara .	17	6	23	347,280	129,632	476,912	35·34	52·60	40·03

* Includes 16,010 persons enumerated at the Ajodhya Fair.

† The total excludes the increased population of Bombay city according to the special Census of 1906.

TABLE XXI—DEATHS ACCORDING TO AGE.

Province.	Ratio per 1,000 of Population.																	
	Under one year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.		20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years and upwards.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female	Male.	Female.	Male.	Female.	Male.	Female.
Bengal* ...	303·92	264·68	59·97	53·39	22·55	18·74	16·05	14·00	19·63	18·39	23·30	21·65	27·97	23·86	34·64	27·12	54·66	48·34	100·76	81·61
Eastern Bengal and Assam.	255·85	212·56	44·45	36·64	15·41	12·42	10·66	10·05	15·90	18·58	7·26	20·71	21·32	23·11	27·94	25·27	43·09	37·38	77·48	59·58
United Provinces of Agra and Oudh.	419·33	418·79	115·96	117·78	25·98	24·30	13·60	13·56	16·12	19·92	20·58	22·97	25·14	25·03	38·32	35·40	66·66	62·90	130·22	117·13
Punjab ...	393·79	408·64	111·33	121·09	23·02	26·26	15·03	19·95	16·49	20·44	16·95	20·87	19·65	24·15	28·99	29·79	43·85	44·49	110·94	118·67
North-West Frontier Province.	232·1	190·4	55·6	54·2	15·8	16·9	10·5	13·0	9·5	11·1	13·6	17·4	17·7	23·4	29·6	32·5	43·3	43·5	84·6	78·2
Central Provinces and Berar	Information not available.																			
Madras Presidency. †	217·1	177·8	34·0	32·3	11·5	10·8	8·7	8·4	12·3	15·5	14·3	14·6	16·5	15·3	22·4	18·2	33·6	28·0	75·2	61
Coorg ...	222·30	191·98	56·67	53·99	13·70	11·88	9·68	10·88	16·94	16·66	22·67	29·96	33·18	30·35	44·04	38·95	62·33	50·12	90·65	85·17
Bombay Presidency. †	316·66	289·84	49·01	46·53	8·71	9·21	7·19	8·34	12·13	13·99	13·84	15·21	16·02	15·56	22·86	17·26	30·14	28·84	81·75	74·68
Burma { Lower	339·64	246·72	32·84	29·23	14·85	13·14	10·88	9·68	14·40	12·12	15·45	14·72	20·49	19·79	27·74	23·75	33·21	28·54	76·21	72·21
Burma { Upper	351·52	255·09	35·30	33·70	12·46	11·86	8·36	7·68	11·35	9·49	11·75	12·21	15·07	16·21	19·38	15·73	30·21	22·29	76·92	67·64
Ajmer-Merwara.	298·13	240·51	166·53	16·80	16·99	16·45	6·50	6·84	9·33	10·91	12·67	18·32	17·33	20·55	26·19	22·59	51·13	43·52	101·09	87·73
Total ...	249·64‡	241·40‡	67·29	64·55	18·76	17·00	12·34	12·16	15·84	17·75	18·52	19·66	22·14	21·60	30·58	26·52	48·88	44·08	98·73	87·59

* Revised population figures according to age of the Saran District not available and hence the discrepancy of 402 in the total population of the province.

† Calculated on the total population as per census of 1901, including Europeans and Eurasians though the statistics are exclusive of Europeans and Eurasians and born dead.

‡ Ratio calculated on the number of births during 1908.

Note.—The total ratios under the age periods "1—5" to "60 years and upwards" exclude Central Provinces and Berar for which the age distribution of the population is not known.

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TABLE XXII.—DEATHS ACCORDING TO CAUSE.

Province.	Deaths per 1,000 of Population in 1908.								All causes.	Ratio of deaths in 1907.	Ratio of deaths in 1908.
	Cholera.	Small-pox.	Plague.	Fevers.	Dysentery Diarrhœa.	Respiratory diseases.	Injuries.	All other causes.			
Bengal	5·32	·71	·31	23·44	1·28	·30	·49	6·68	38·56	37·72	36·08
Eastern Bengal and Assam ...	4·99	·31	...	22·37	·83	·13	·33	4·76	30·74	29·30	31·67
United Provinces of Agra and Oudh.	1·75	1·26	·48	41·31	·41	·43	·57	6·52	52·73	43·46	39·07
Punjab	·61	1·42	1·53	34·66	1·05	3·22	0·35	7·88	50·73	62·10	36·94
North-West Frontier Province ...	1·49	0·38	0·30	26·66	0·17	0·97	0·44	4·45	35·83	35·12	33·73
Central Provinces and Berar ...	0·76	0·75	0·52	18·16	3·40	2·59	0·58	11·36	38·12	41·70	43·47
Madras Presidency	3·9	0·6	0·1	8·0	1·7	0·8	0·3	10·8	26·2	24·3	27·1
Coorg	·63	·21	·14	27·84	2·26	·12	·13	3·62	34·94	35·15	29·26
Bombay Presidency	·09	·14	1·48	13·17	2·21	2·96	·38	6·72	27·15	32·82	35·06
Burma { Lower	1·68	·13	·93	9·63	1·77	·94	·33	12·65	28·06	26·84	27·15
Burma { Upper	·88	·19	·54	8·	·68	·81	·42	16·76	28·52	26·13	26·22
Ajmer-Merwara	...	1·81	·15	30·79	1·52	·61	·40	4·75	40·03	39·63	38·82

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TABLE XXIII.—*Total number of deaths by months.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.	RATIO PER 1,000 OF POPULATION. 1908.	1907.
Bengal ...	156,811	130,782	158,015	191,251	185,968	214,645	156,827	169,899	155,083	124,662	139,475	135,095	1,948,513	38·56	37·72
Eastern Bengal and Assam.	71,485	59,328	84,201	89,970	86,804	80,293	62,957	63,396	65,775	61,424	91,624	99,291	916,549	30·74	29·30
United Provinces of Agra and Oudh.	174,370	132,226	140,345	159,962	179,115	173,167	121,309	135,158	202,152	392,915	397,191	306,851	2,514,761	52·73	43·46
Punjab ...	73,677	50,862	55,950	56,235	61,367	52,456	43,449	46,929	99,637	207,510	166,397	105,596	1,020,125	50·73	40·10
North-West Frontier Province	7,860	5,767	4,500	3,646	6,283	5,165	3,761	4,286	4,837	7,573	8,004	6,679	68,361	35·83	25·12
Central Provinces and Berar	35,453	29,819	32,501	34,722	38,189	34,805	28,205	41,900	52,573	50,969	42,005	35,940	457,081	38·12	31·70
Madras Presidency.	96,862	75,883	74,050	67,144	69,981	74,263	88,066	96,811	81,417	74,302	77,390	84,750	960,919	26·2	24·3
Coorg ...	393	425	590	509	672	814	646	607	452	389	284	430	6,591	34·04	35·15
Bombay Presidency.	46,088	42,552	48,146	42,527	36,658	30,909	33,972	41,734	42,142	44,724	45,909	46,477	501,838	27·15	32·82
Burma { Lower ...	14,069	11,620	10,772	11,827	11,864	12,796	16,727	15,604	13,657	13,243	12,537	11,543	156,259	28·06	26·84
Burma { Upper ...	7,090	6,276	6,739	7,419	6,027	6,614	7,646	695	6,918	7,009	6,925	7,412	83,700	28·52*	26·13
Ajmer-Merwara.	1,620	1,377	1,724	1,587	1,218	880	846	1,363	1,668	2,380	2,263	2,167	19,093	40·03	29·63
Total ...	685,778	516,917	647,533	666,799	684,146	686,837	564,411	624,782	726,361	987,100	990,304	842,031	8,653,007	38·21	37·18

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TABLE XXIV.—*Ratio of Deaths from all causes according to months.*

Province.	§ ANNUAL DEATH RATE PER MILLE FOR THE MONTH OF— January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Rate for the year.
Bengal	36·64	32·67	43·93	46·18	43·45	51·83	36·64	39·70	37·44	29·13	33·68	31·57	38·56
Eastern Bengal and Assam	28·31	25·12	33·35	36·82	34·38	32·86	24·93	25·11	26·92	24·33	37·49	39·32	30·74
United Provinces of Agra and Oudh ...	43·17	34·99	34·74	40·92	44·34	44·30	30·03	33·46	51·71	97·27	101·61	75·96	52·73
Punjab	43·26	31·94	32·85	34·12	36·03	31·83	25·51	27·55	60·49	121·84	101·07	61·88	50·73
North-West Frontier Province	48·63	38·14	27·84	23·31	38·87	33·02	23·27	26·52	30·93	46·86	51·17	41·32	35·83
Central Provinces and Berar	34·91	31·39	32·00	35·38	37·60	35·41	27·77	41·26	53·49	50·19	42·74	35·39	38·12
Madras Presidency	31·12	26·06	23·79	22·29	22·49	24·66	28·30	31·11	27·03	23·87	25·70	27·23	26·15
Coorg	25·69	29·70	38·57	34·38	43·93	54·99	42·23	39·68	30·53	25·43	25·94	28·11	34·94
Bombay Presidency	29·43	29·06	30·75	28·07	23·41	20·40	21·69	26·65	27·85	28·56	30·31	29·85	27·15
Burma { Lower	29·83	26·34	22·84	25·91	25·15	28·03	35·47	33·08	29·92	28·08	27·47	24·47	28·06
Burma { Upper	28·69	27·15	27·27	31·03	24·39	27·78	30·94	28·71	28·93	28·36	28·96	29·99	28·52
Ajmer-Merwara	40·10	36·44	42·68	40·60	30·15	22·51	20·94	33·74	42·67	58·92	57·89	53·65	40·03
India ...	35·76	30·49	33·77	35·93	35·68	37·01	29·43	32·58	39·14	51·47	53·36	43·91	38·22

§The ratios in this statement have been calculated with reference to the number of days in each month.

TABLE XXV.—*Deaths from* CHOLERA *in the different provinces in India from 1888 to 1908.*

Year.	Bengal.	Assam.	United Provinces of Agra and Oudh.	Punjab.	(a) N.-W. Frontier Province.	Central Provinces.	Berar.	Madras.	Coorg.	Bombay.	Lower Burma.	Upper Burma.†	Ajmer-Merwara.	Rajputana.	Central India.	Hyderabad (cantonment stations).	Mysore.
1888	111,391	9,693	18,704	14,038	...	921	305	58,677	2	36,300	15,982	...	13	32	191	2,057	1,015
1889	171,103	18,288	48,494	2,838	...	32,568	18,925	76,020	9	32,431	3,240	...	55	6,923	3,344	1,128	2,590
1890	145,685	15,396	80,295	2,401	...	4,787	847	35,288	5	3,259	1,076	...	408	2,746	3,132	...	1,326
1891	229,573	28,882	169,913	10,107	...	21,312	7,958	98,773	7	17,850	2,400	...	532	2,946	13,474	3,102	1,204
1892	259,398	21,552	194,886	75,959	...	39,972	2,030	79,033	58	42,900	6,208	...	2,332	26,769	8,384	53	5,497
1893	126,976	21,849	12,154	639	...	557	1,188	38,209	9	18,853	2,893	...	3	314	127	165	680
1894	236,150	15,497	178,079	113	...	7,043	3,454	42,289	8	33,588	7,428	...	...	2	5,219	1,862	328
1895	177,087	18,962	51,562	549	...	15,506	11,919	21,172	...	8,890	5,150	...	289	1,049	6,043	467	2,334
1896	226,824	19,043	69,147	5,146	...	52,985	42,264	47,847	49	35,404	2,959	...	12	3,797	15,766	525	2,100
1897	196,247	33,240	44,208	622	...	57,131	10,122	143,445	106	57,109	8,538	...	39	3,496	13,202	1,939	4,248
1898	65,020	11,149	2,508	338	...	7	...	65,444	8	4,368	2,972	...	1	6	2	6	1,193
1899	107,678	8,380	8,142	1,816	...	761	541	29,082	...	8,579	4,942	2,650	1	498	...	...	423
1900	345,878	23,761	84,960	28,260	...	63,114	18,375	60,662	...	163,889	3,440	41	4,842	28,719	20,459	3,813	779
1901	210,753	7,468	53,998	180	117	49	17	81,370	58	13,600	3,352	‡	50	6	72	1	11,351
1902	150,971	12,658	25,166	371	...	28	16	29,769	...	3,230	1,844	57	32	1,519	12	...	218
1903	303,405	8,360	47,159	14,688	1,384	437	...	27,393	...	1,825	5,346	2,887	...	236	1,110	...	98
1904	137,791	5,588	6,617	726	1	2,967	...	23,109	...	13,156	2,472	508	...	1	150	...	471
1905	146,339	14,312**	121,790	2,197	300	1,217	...	18,888	...	5,396	3,511	1,836	...	3	27	64	626
1906	192,596	108,278	149,549	4,232	...	38,768	...	142,811	10	46,119	5,529	2,343	284	4,714	10,147	1,061	7,223
1907	205,702	77,181	22,438	437	266	4,291	...	81,565	187	7,656	7,964	414	1	64	478	1	4,972
1908	168,908	56,329	83,544	12,297	2,845	9,048	...	141,970	114	1,759	9,336	2,575	...	737	1,736	937	2,449

* Excluding Calcutta from 1888 to 1892.
† Statistics from 1888 to 1898-not available.
‡ Statistics not available.
§ Including 30 deaths in cantonments.
‖ Excluding Zamindaris.
¶ Including Berar from 1903.
** Eastern Bengal and Assam.
(a) 1888—1900 included in the Punjab.

GENERAL POPULATION.

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TABLE XXVI.—*Deaths from* CHOLERA *in British Provinces, by months, during the year 1908.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population. 1908.	1907.
Bengal ...	11,826	12,564	29,984	42,895	46,112	53,793	30,124	25,095	10,343	3,317	1,602	1,173	268,908	5·32	4·07
Eastern Bengal and Assam.	3,242	2,630	8,892	16,568	15,339	5,598	2,348	1,121	815	530	685	1,570	59,329	1·99	2·58
United Provinces of Agra and Oudh.	79	43	86	2,232	11,657	16,661	4,689	11,993	19,349	14,483	2,126	146	83,544	1·75	·47
Punjab ...	...	...	1	443	1,966	2,130	2,155	2,528	2,354	654	74	...	12,297	0·61	0·02
North-West Frontier Province.	...	...	...	...	775	731	210	242	385	420	81	1	2,845	1·49	0·14
Central Provinces and Berar.	9	24	34	136	87	430	997	2,598	2,347	1,790	599	94	9,048	0·76	0·36
Madras Presidency.	15,649	11,081	8,829	7,375	8,102	11,695	19,956	25,685	12,428	7,036	6,079	8,055	141,970	3·9	2·2
Coorg ...	2	1	16	10	38	38	9	...	...	...	...	...	114	·68	1·04
Bombay Presidency.	49	90	111	49	91	328	416	241	37	5	102	240	1,759	·09	·41
Burma { Lower...	652	368	564	1,422	1,222	751	1,218	609	555	1,058	686	221	9,336	1·68	1·43
Burma { Upper...	26	58	149	473	47	69	501	197	261	487	189	136	2,575	·88	·14
Ajmer-Merwara ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	·002
Total ...	31,534	26,859	48,666	71,603	85,507	92,225	62,623	70,204	48,874	29,780	12,214	11,636	591,725	2·61	1·81

TABLE XXVII.—*Details of the distribution and occurrence of Cholera during the year 1908.*

Province.	Mortality in 1908.	Mean mortality of previous five years.	Urban mortality.	Rural mortality.	Precentage of villages attacked.	Maximum mortality in any one district excluding towns.	Maximum mortality in any one town.	Month of maximum mortality.
Bengal	5·32	3·11	4·32	5·38	24·47	26·56	36·42	June.
Eastern Bengal and Assam	1·99	2·95	2·16	1·98	9·97	8·84	23·18	April.
United Provinces of Agra and Oudh ...	1·75	1·46	1·27	1·79	6·68	7·60	12·45	September.
Punjab	0·61	0·22	1·59	0·50	3·54	2·06	19·48	August.
North-West Frontier Province ...	1·49	0·20	2·77	1·37	13·10	2·35	5·55	May.
Central Provinces and Berar ...	0·76	·79	0·56	0·78	2·67	2·16	11·79	August.
Madras Presidency	3·9	1·6	4·8	3·7	20·37	9·2	49·5	August.
Coorg	·63	·22	...	·69	...	2·01	...	May and June.
Bombay Presidency	·09	·85	·19	·08	0·36	1·52	3·42	July.
Burma { Lower	1·68	·89	2·84	1·52	6·68	5·93	26·08	April.
Burma { Upper	·88	·55	1·43	·81	3·46	2·64	28·81	July.
Ajmer-Merwara	·12	...	...	...	...	...	...	...

General Population.

Table XXVIII.—Small-pox Mortality.

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months :—													
January	2,935	1,551	4,738	2,368	143	639	2,275	10	133	18	17	216	13,913
February	2,799	715	4,677	1,786	87	629	2,435	4	227	48	41	123	13,578
March	4,921	1,183	8,185	2,881	45	909	3,204	2	444	37	98	173	21,213
April	6,390	1,535	11,641	3,727	48	1,370	3,403	15	419	82	153	165	28,048
May	5,534	1,585	12,428	5,057	...	1,130	1,958	96	335	116	117	89	28,773
June	5,330	1,296	9,325	4,227	75	1,298	1,553	1	217	71	88	46	24,527
July	2,653	715	5,721	3,853	77	966	1,512	...	172	98	31	15	15,848
August	1,370	378	2,204	1,580	43	614	1,264	...	97	119	3	7	7,677
September	622	302	804	904	41	265	1,236	...	62	30	2	...	4,268
October	351	197	350	562	17	170	1,242	...	58	32	...	...	2,879
November	858	310	400	422	37	253	1,436	...	105	36	...	21	3,868
December	2,193	622	521	399	43	421	1,506	...	257	33	...	10	6,085
Total ...	35,065	9,373	59,996	28,652	734	9,044	22,204	38	2,526	748	550	863	170,694
B.—Annual death ratios :—													
Ratio per 1,000 of population, 1908.	·71	·31	1·26	1·42	0·38	0·75	0·6	·21	·14	·13	·19	1·81	0·71
Ratio per 1,000 of population, 1907.	·57	·29	·47	0·55	0·40	0·32	0·26	1·17	·10	·28	·46	1·04	0·46
Difference ...	+·14	+·02	+·79	+·87	—·02	+·43	...	—·96	+·04	—·15	—·27	+·77	+·29
Mean ratio per 1,000 during 1903-07 ...	·37	·23	·29	0·54	0·70	·44	0·5	·70	·32	·63	·25	·49	0·38
Difference ...	+·34	+·08	+·97	+·83	—·32	+·31	+·1	—·49	—·18	—·50	—·06	+1·32	+·37
II.—District mortality excluding towns :—													
Number of districts affected ...	32	22	48	29	5	23	22	3	32	13	9	17	245
Highest district ratio ...	3·32	3·95	5·79	5·11	0·81	2·59	1·8	0·78	·17	2·39	·97	5·23	5·79
Name of that district ...	Patna.	Darrang	Partabgarh	Lyallpur.	Peshawar	Bilaspur	Vizagapatam.	Mercara Taluk.	Ratnagiri	Kyaukpyu	Pakokku.	Pohkar.	Partabgarh.
Lowest district ratio	·005	·009	·01	0·06	0·01	·009	0·04	0·08	·003	·001	·02	·39	·005
Name of that district	Darjeeling	Cachar	Muttra.	Dera Ghazi Khan.	Bannu.	Murwara	Tinnevelly	Kiggatnad	Hyderabad.	Henzada	Meiktila.	Masuda.	Henzada.
Number of districts without mortality.	None	None	None.	None	None	1	None.	2	3	5	2	None.	13
District death rate per 1,000 of population.	·69	·31	1·29	1·36	0·30	0·75	0·6	·25	·06	·15	·18	1·80	0·75
III.—Town mortality :—													
Number of towns affected ...	102	24	78	148	4	54	112	None.	36	9	4		
Highest town ratio	17·82	2·96	9·07	21·83	1·79	12·40	6·9	...	3·56	1·91	2·47	4·82	
Name of that town	Dumka	Golaghat.	Muharakpur.	Shahabad	Haripur.	Rajim.	T. C. Rasam.	...	Dhulia.	Kyaukpyu	Pakokku	Ajmer Suburb.	Rau
Lowest town ratio	·02	·04	·02	0·13	0·05	0·03	0·02	...	·05	·03	·02	·32	
Name of that town	Baranagore.	Sibsagar.	Jhansi.	Isa Khel.	Kohat.	Burhanpur.	M. T. C. Cuddalore	...	Chopda.	Bassein.	Mandalay.	Nasirabad Town.	Mand
Number of towns without mortality.	26	30	27	15	7	51	120	5	39	30	18	1	
Town death rate per 1,000 of population.	·90	·29	·79	2·25	0·26	0·76	0·3	...	·38	·28	·723	1·84	0·7
IV.—Infantile mortality :—													
Children under one year ...	6,028	1,571	13,362	4,499	186	2,329	6,665	...	666	164	39	300	44,85
Children 1—10 years	13,898	3,401	30,134	16,965	484	3,314	5,955	...	900	84	175	551	75,86
Percentage of children in total small-pox mortality.	55·40	53·05	74·50	81·83	87·19	73·67	56·84	...	63·00	15·78	38·91	98·62	70·6

General Population.

Table XXIX.—Fever Mortality.

Provinces, Districts and Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration, India.
I.—Mortality by Provinces :—													
A.—Deaths by months :—													
January	101,607	52,715	135,057	45,692	6,319	15,846	27,817	326	23,843	5,830	2,372	1,136	418,555
February	79,655	43,397	90,488	28,432	4,496	13,175	21,528	327	21,918	4,387	1,787	1,016	316,106
March	105,640	58,495	96,057	28,414	3,398	14,756	23,102	466	23,866	3,767	2,064	1,214	361,189.
April	102,978	56,995	102,855	28,747	2,548	16,834	21,578	387	20,245	3,711	2,203	1,078	356,858
May	99,667	55,230	112,605	31,970	3,946	19,025	23,156	502	17,727	3,793	1,718	877	369,935
June	133,815	58,788	110,304	28,949	3,369	17,596	23,369	582	14,234	4,194	1,801	664	377,755
July	88,625	47,216	82,457	22,796	2,557	13,300	24,004	528	15,174	5,625	1,972	653	305,135
August	102,841	48,745	93,397	25,650	2,803	18,024	25,615	503	18,286	4,490	1,892	1,083	344,447
September	100,922	50,319	153,404	69,428	3,283	23,720	26,359	396	18,348	4,878	1,964	1,088	454,549
October	89,226	46,302	344,862	169,155	5,910	26,232	24,381	332	22,003	3,881	1,926	2,016	736,387
November	103,489	71,880	363,545	138,161	6,634	23,015	25,501	318	24,796	4,102	2,082	1,837	764,358
December	95,711	77,005	279,488	83,364	5,384	17,349	28,515	358	24,192	4,442	2,141	1,748	620,097
Total ...	1,184,704	667,145	1,970,319	697,058	50,795	217,773	295,834	5,028	243,372	53,094	24,011	14,664	5,424,372
B.—Annual death ratios													
Ratio per 1,000 of population, 1906.	23·44	22·37	41·31	34·66	36·61	18·16	8·0	27·84	13·17	9·63	8·23	30·79	23·96
Ratio per 1,000 of population, 1907.	23·18	21·17	28·31	20·16	37·24	18·00	7·8	26·95	14·09	10·28	7·53	23·31	19·76
Difference ...	+ ·26	+ 1·20	+ 13·00	+ 14·50	— ·63	+ ·16	+ ·2	+ ·89	— ·92	— ·65	+ ·70	+ 7·48	+ 4·20
Mean ratio per 1,000 during 1903-1907	22·21	22·44	26·88	20·60	34·32	16·50	8·0	24·18	13·98	9·81	7·25	23·15	19·35
Difference ...	+ 1·23	— ·07	+ 14·43	+ 14·05	+ 2·30	+ 1·57	...	+ 3·66	— ·81	— ·18	+ ·98	+ 7·66	+ 4·61
II.—District mortality excluding towns :—													
Number of districts affected ...	32	22	48	29	5	24	22	1	25	18	11	17	256
Highest district ratio	40·30	37·86	78·29	52·73	49·24	26·22	20·9	34·12	29·26	16·38	16·70	50·45	72·29
Name of that district	Pabna.	Jalpaiguri	Bareilly	Delhi	Peshawar.	Damoh	Vizaga-patam.	Nanjaraj-patna.	Broach.	Thayet-waddy.	Mandalay	Ghegaf	Bareilly.
Lowest district ratio	9·94	13·47	19·40	9·13	25·23	6·72	2·2	21·31	5·79	2·36	3·92	18·04	1·2
Name of that district	Howrah	Sylhet	Ballia	Simla	Dera Ismail Khan	Buldana	Ananta-pur.	Yedenal-knad.	Belgaum	Maubin	Méiktila	Sawar	Ananta-pur.
Number of districts without mortality.	None	None	None	None	None	None	None	None	None	None	None	None	None.
District death rate per 1,000 of population.	24·30	22·59	41·88	34·99	27·44	18·93	8·3	28·10	13·80	10·31	8·85	32·37	24·67
III.—Town mortality :—													
Number of towns affected	128	54	105	143	11	105	231	5	65	39	17	6	909
Highest town ratio	80·51	30·45	104·69	91·38	56·22	24·94	23·7	34·39	27·35	26·89	8·93	86·51	104·69
Name of that town	Shahjahan-ganj.	Sherpur	Kairana	Hodal	Nowa-shahr.	Yeotmal	T.C. Seringa-vampukotai.	Somwar-per.	Umarkot	Allanmyo	Yenang-yaung.	Pyangan	Kairana.
Lowest town ratio	1·45	2·93	9·97	1·22	2·50	1·11	0·1	20·20	·93	·75	1·05	23·35	0·1
Name of that town	Budge Budge.	Mymen-singh.	Mirzapur (Bindha-chal.)	Dharm-sala.	Tank	Deulgaon	T.C. Kosgi	Mercara	Bijapur	Zalun	Mying-yan.	Ajmer	T.C. Kosgi.
Number of towns without mortality.	None	None	None	None	None	None	1	None	None	None	None	None	1
Town death rate per 1,000 of population.	10·76	12·55	33·85	32·53	18·16	11·49	3·09	24·98	8·38	8·03	3·38	26·54	157

GENERAL POPULATION.

TABLE XXX.—DYSENTERY AND DIARRHŒA MORTALITY.

PROVINCES, DISTRICTS AND TOWNS.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months—													
January	4,691	1,376	1,313	1,043	35	2,562	7,280	13	3,365	659	173	39	22,479
February	4,013	1,388	958	722	19	2,067	5,110	21	3,899	673	128	31	17,849
March	5,907	1,613	1,098	764	21	2,243	4,874	46	3,118	671	138	44	20,534
April	5,421	2,377	1,777	1,021	29	2,656	4,268	38	3,286	767	158	56	21,852
May	5,358	2,596	2,339	1,617	46	2,848	4,330	74	3,294	955	148	50	23,865
June	6,387	2,439	2,084	1,182	24	2,858	4,614	106	2,937	957	215	28	23,016
July	5,579	2,815	1,520	933	8	2,475	5,425	46	3,628	1,348	324	48	23,546
August	7,046	2,169	1,868	1,379	28	5,449	6,175	30	4,777	1,250	188	93	30,450
September	7,991	2,075	1,775	2,806	22	6,885	5,233	10	4,552	853	221	104	33,527
October	4,648	2,313	1,804	4,092	27	5,256	4,557	5	3,283	733	226	59	26,828
November	3,972	2,091	1,478	3,348	35	3,573	4,278	7	2,825	522	124	88	23,141
December	3,886	3,101	1,421	2,181	18	2,748	4,726	12	3,027	545	202	77	20,834
Total ...	64,899	24,813	19,388	21,103	330	40,760	60,874	408	40,781	9,833	2,675	727	285,921
B.—Annual death ratios :—													
Ratio per 1,000 of population, 1908 ...	1·28	·83	·41	1·25	0·17	3·49	1·7	2·20	2·21	1·77	·68	1·32	1·26
Ratio per 1,000 of population, 1907 ...	1·02	·68	·47	0·75	0·29	3·98	1·7	2·08	2·81	1·62	·47	1·02	1·25
Difference ...	+·26	+·15	—·06	+·50	—·12	—·54	—	+·12	—·70	+·16	+·21	+·48	+·01
Mean ratio per 1,000 during 1902-07 ...	·93	·73	·56	0·75	0·39	3·05	1·5	·93	3·12	1·51	·46	·97	1·20
Difference ...	+·35	+·11	—·18	+·30	—·12	+·35	+·2	+1·33	—·91	+·26	+·22	+·55	+·06
II.—District mortality excluding towns :—													
Number of districts affected ...	32	22	48	29	5	24	22	5	25	18	11	10	251
Highest district ratio ...	9·62	7·49	8·58	3·17	0·23	9·36	4·8	3·40	7·35	2·94	·84	4·45	9·62
Name of that district ...	Puri	Lakhimpur.	Garhwal	Simla	Dera Ismail Khan.	Akola	Malabar	Vedachalnad.	East Khandesh	Mergui	Pakokku	Dewair	Puri.
Lowest district ratio ...	·03	·02	·01	0·10	0·04	0·19	0·3	0·55	·01	·09	·12	·08	·02
Name of that district ...	Shahabad	Malda	Jaunpur	Hoshiarpur.	Kohat	Bhandara	Vizagapatam.	Nanjarajpatna.	Upper Sind Frontier.	Maubin	Kyaukse	Pokhar	Jaunpur
Number of districts without mortality.	None	None	None	None	None	None	None	None	None	None	None		7
District death rate per 1,000 of population.	1·19	·81	·80	0·84	0·10	3·37	1·4	1·79	2·05	1·36	·57	·19	1·12
II.—Town mortality :—													
Number of towns affected ...	125	52	93	138	10	105	215	4	165	38	12	5	865
Highest town ratio ...	8·05	11·49	6·61	8·75	2·30	11·70	9·9	16·15	12·81	13·00	4·00	12·96	16·11
Name of that town ...	Kurseong	Sibsagar	Chandausi	Jhang-Maghiana	Kulachi	Nandura	M. T. C. Bimlipatam.	Virajendrapet.	Nasirabad.	Insein	Yenangyaung.	Ajmer Suburb	Virajendrapet.
Lowest town ratio ...	·09	·14	·08	0·29	0·14	0·06	0·1	1·42	·07	·23	·23	·23	·06
Name of that town ...	Jangipur	Bogra	Rudauli	Tanda Urmar.	Kohat	Umrer	T. C. Pamagudi.	Bodipet	Larkhana	Nyaungtebin.	Yamethin	Pisangan Town.	Umrer.
Number of towns without mortality.	3	2	312	5	1	None	27	1	2	1	None.	1	45
Town death rate per 1,000 of population.	2·54	1·62	1·83	2·90	0·91	3·07	3·5	2·24	3·30	1·56	1·56	3·08	2·8

General Population.

Table XXXI.—Plague Mortality.

Province or State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total. 1908.	Total. 1907.
British Provinces:—														
Bengal	1,587	3,352	6,001	3,064	489	257	103	70	99	191	318	542	15,948	83,602
Eastern Bengal and Assam	...	...	...	...	...	...	...	...	...	...	...	...	...	8
United Provinces of Agra and Oudh.	2,743	5,148	7,895	5,042	907	90	55	39	93	81	209	576	22,878	338,362
Punjab	1,173	3,130	7,407	10,459	4,721	662	19	15	244	621	983	1,284	30,708	668,685
North-West Frontier Province.	1	...	3	219	280	49	2	...	...	...	...	...	563	1,547
Central Provinces and Berar	639	894	728	338	22	...	9	272	1,101	1,166	535	548	6,250	37,7[illegible]
Madras Presidency ...	464	318	309	201	138	114	236	491	314	324	223	136	3,358	2,972
Coorg	2	9	6	4...	1	4	...	...	...	2	2	...	26	
Bombay Presidency ...	2,245	2,567	3,796	3,185	1,650	457	542	1,811	3,011	3,712	2,699	1,890	27,345	93,609
Burma { Lower ...	717	1,056	759	393	443	522	647	273	107	66	57	129	5,169	5,972
Burma { Upper ...	269	363	231	38	6	15	11	6	38	37	105	428	1,583	3,297
Ajmer-Merwara ...	12	4	32	20	...	...	...	...	3	3	1	...	74	13
Total... { 1908 ...	9,852	16,840	27,166	23,059	8,627	2,070	1,630	2,717	5,010	6,202	5,132	5,533	113,888	...
Total... { 1907 ...	57,320	102,249	237,052	348,607	270,406	61,246	11,840	20,004	22,915	23,148	11,921	9,516	...	1,166,223
Native States, etc:—														
Bengal Native States ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Eastern Bengal and Assam Native States.	...	...	...	...	...	...	...	...	...	...	...	...	...	7
United Provinces of Agra and Oudh Native States.	...	...	...	...	3*	...	...	...	...	...	...	...	3*	185
Punjab Native States ...	217	645	1,048	2,491	2,390	225	1	...	81	320	563	545	9,124	61,231
Native States in Central Provinces.	...	...	...	...	...	...	...	...	...	...	...	...	...	958
Madras Native States ...	2	...	...	...	...	...	...	...	...	...	...	...	2	1
Bombay Presidency Native States.	1,581	2,005	2,374	1,796	457	215	76	664	1,072	1,583	898	707	14,327	54,186
Baluchistan	...	...	...	...	...	1	...	...	...	...	...	...	1	5
Bangalore Civil and Military Station.	164	112	57	19	24	18	16	32	114	86	67	41	750	1,288
Rajputana	868	2,989	4,923	5,031	191	2	...	...	144	304	285	325	15,262	5,826
Central India	65	214	125	37	2	...	...	30	162	360	277	112	1,404	8,809
Hyderabad State ...	205	93	57	22	4	...	54	338	220	389	179	64	1,625	3,038
Mysore	1,461	1,064	641	158	158	172	400	739	703	639	570	428	7,133	11,8[illegible]
Kashmir and Kashmir States	...	4	4	42	3	6	...	2	...	...	...	...	61	3,[illegible]
Total { 1908 ...	4,363	7,126	8,117	5,596	3,232	639	547	2,824	3,396	3,681	2,839	2,232	42,592	...
Total { 1907 ...	7,937	12,787	20,027	24,143	24,482	3,050	3,043	6,268	14,255	17,[illegible]66	8,988	4,738	...	149,669
Grand Total { 1908 ...	14,205	23,966	35,283	28,655	11,859	2,709	2,177	5,601	8,406	9,883	7,971	7,765	156,480	...
Grand Total { 1907 ...	65,257	115,036	257,078	372,750	294,888	64,296	14,883	26,272	37,170	40,914	20,909	14,254	...	1,315,892
Calcutta City	65	84	208	499	308	131	98	54	33	38	38	28	1,679	...
Bombay City	80	350	1,452	1,811	951	203	135	143	107	84	28	26	5,348	...
Madras City	...	...	1	...	...	1	...	...	1	...	...	...	3	...

*Suspected plague deaths—imported.

General Population.

Table XXXII.—Mortality from Respiratory Diseases.

Provinces, Districts and Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces:—													
A.—Deaths by months:—													
January	1,663	359	2,432	8,669	239	3,095	2,663	...	5,456	435	242	47	25,287
February	1,371	320	1,907	5,535	128	2,900	2,289	1	5,437	312	192	35	20,198
March	1,634	388	1,795	5,563	118	3,158	2,275	...	5,610	410	204	29	21,169
April	1,218	360	1,668	4,322	115	2,539	2,052	4	4,552	468	174	23	17,501
May	1,177	279	1,757	4,433	179	2,322	2,169	2	4,084	417	168	17	16,054
June	1,211	261	1,626	3,809	204	1,663	2,096	1	3,621	456	254	16	15,243
July	1,103	270	1,219	3,557	139	1,636	2,352	2	3,677	442	179	7	14,583
August	1,252	299	1,505	4,139	183	2,141	2,253	...	4,233	541	242	14	16,851
September	1,138	292	1,659	6,358	152	2,619	2,197	2	4,250	537	234	16	19,449
October	957	315	2,643	7,377	157	2,653	2,273	2	4,323	454	282	19	20,395
November	1,368	413	1,681	5,719	129	2,947	2,581	3	4,312	407	162	32	19,623
December	1,408	396	1,724	5,273	116	3,097	2,647	5	5,166	394	197	45	20,468
Total ...	15,399	3,930	20,474	64,744	1,857	31,002	27,779	21	54,671	5,260	2,370	290	227,817
B.—Annual death ratios:—													
Ratio per 1,000 of population, 1908.	·30	·53	·43	3·22	0·97	2·59	0·8	·22	2·96	·99	·81	·61	1·01
Ratio per 1,000 of population, 1907...	·29	·09	·46	3·20	0·99	2·64	0·7	·43	3·14	·70	·64	·78	1·00
Difference ...	+ ·01	+ ·04	— ·03	+ ·02	— ·02	— ·05	+ 0·1	— ·21	— ·18	+ ·24	+ ·17	— ·17	+ ·01
Mean ratio per 1,000 during 1903-07	·22	·06	·46	3·03	0·63	2·38	0·6	·19	3·16	·61	·36	·74	0·88
Difference ...	+ ·09	+ ·67	— ·03	+ ·19	+ ·34	+ 1·01	+ 0·8	— ·07	— ·20	+ ·33	+ ·25	— ·13	+ ·13
II.—District mortality excluding towns:—													
Number of districts affected ...	32	22	48	29	5	24	21	1	24	18	11	1	243
Highest district ratio	2·47	1·93	8·75	13·64	1·33	10·87	1·36	0·03	9·00	1·48	·93	·49	13·64
Name of that district	Puri	Lakhimpur.	Hamirpur	Delhi.	Hazara	Jubbulpore.	Anantapur.	Yedenalknad.	Kaira	Tavoy	Lower Chindwin.	Pohkar	Delhi.
Lowest district ratio	·003	·063	·01	0·09	0·19	0·14	0·1	0·03	·03	·01	·03	·04	·003
Name of that district	Darbhanga.	Chittagong.	Bulandshahr.	Muzaffergarh.	Kohat.	Seoni	Vizagapatam.	Yedenalknad.	Larkhana	Sandoway	Kyaukse	Beawar	Darbhanga.
Number of districts without mortality.	None	None	None	None	None	None.	1	1	1	None	None	11	31
District death rate per 1,000 of population.	·18	·12	·26	2·92	0·63	2·45	0·7	·06	2·09	·32	·28	·08	0
III.—Town mortality:—													
Number of towns affected ...	58	32	94	143	11	94	177	1	63	34	17	4	765
Highest town ratio	6·08	2·81	21·36	14·85	9·39	16·30	9·2	7·97	19·76	11·75	13·45	4·00	21·36
Name of that town	Calcutta	Mangaldai.	Rath	Dalhousie	Buffa	Khurai	M. T. C. Cochin.	Mercara	Ahmednagar.	Wakema	Taungdwingyi.	Ajmer Suburb.	Rath
Lowest town ratio	·05	·08	·08	0·28	0·68	0·06	0·1	2·97	·13	·13	·58	·28	·01
Name of that town	Purulia	Narayanganj.	Saharanpur.	Khangarh	Tank	Umrer	T. C. Tenkasi.	Mercara.	Mahad	Shwegyin	Yamethin	Kekri	Saharanpur.
Number of towns without mortality	30	24	11	None.	None	11	55	4	2	5	None	2	142
Town death rate per 1,000 of population.	·10	·30	2·72	5·94	4·53	3·97	1·8	1·31	7·96	5·19	4·98	2·02	2·38

General Population.

Table XXXIII.—Vaccination.

A.—*Total Primary vaccinations and Revaccinations, successful cases among the children, cost of the Special Vaccination Department, etc., during the official year 1908-09.*

Province.	Number of operations performed by the Special and Dispensary Staffs combined.		Percentage of successful cases* to total operations.		Number of children successfully vaccinated by the Special and Dispensary Staffs combined.		Average number of operations performed by each vaccinator of the Special Staff.	Total cost of the Special Department.	Average cost of each successful case vaccinated by the Special Department.
	Primary.	Revaccination.	Primary.	Revaccination.	Under one year.	1 to 6 years.			Rs. A. P.
Bengal†	1,810,213	209,318	99·34	61·78	851,786	843,147	2,077	2,17,721	0 1 7
Eastern Bengal and Assam	1,351,834	100,426	98·76	74·26	377,425	770,343	1,257	1,10,614	0 1 3
United Provinces of Agra and Oudh ...	1,325,443	131,342	96·49	80·84	794,130	402,814	1,584	1,77,625	0 2 1
Punjab	523,087	145,811	98·43	76·93	417,998	74,850	2,531	1,14,761	0 3 1
North-West Frontier Province ...	81,181	10,187	98·38	82·10	49,125	17,542	‡ 2,591	12,575	0 2 5
Central Provinces and Berar	553,438	86,209	98·78	75·66	419,424	108,911	2,000	72,482	0 1 11
Madras	1,478,771	170,634	95·48	81·37	626,677	590,577	§ 1,963	3,21,757	0 3 5
Coorg	8,509	1,973	92·41	75·05	878	4,216	1,138	2,809	0 5 0
Bombay	673,347	52,425	96·02	70·65	470,417	104,887	1,654	3,27,370	0 8 5
Burma	342,977	53,436	93·59	59·99	88,317	154,678	1,476	1,49,847	0 7 5
Ajmer-Merwara	12,497	304	97·48	92·11	10,092	1,774	853	2,975	0 3 10
Total ...	8,161,297	962,065	97·47	73·44	4,106,269	3,073,939	1,507	15,10,536	0 2 10

* Excluding those the results of which were not known.
† Excluding figures for the Tributary States, Orissa, received too late for incorporation.
‡ Including the vaccinations performed in cantonments and Political Agencies.
§ Excludes average of work done by each medical subordinate.

B.—*Vaccination operations performed by the Special and Dispensary Establishments separately, deaths from small-pox, etc., during the official year 1908-09.*

Province.	Population.	Number of operations performed (primary and revaccinations combined).			Ratio of successful vaccinations per 1,000 of population.	Percentage of annual estimated births at 40 per 1,000 of population successfully vaccinated.	Deaths from small-pox*.	
		By Special Department.	By Dispensary Staff.	Total.			Number.	Ratio per 1,000 of population.
Bengal §	48,500,325	1,876,750	142,781	2,019,531	39·28	43·91	35,966	·71
[illegible] and Assam ...	30,788,134	1,447,639‡	4,621¶	1,452,260	45·24	30·65	9,373	·31
[illegible] of Agra and Oudh ...	47,960,667†	1,456,020	765	1,456,785	28·30	41·39	59,996	1·26
[illegible]	20,296,870	668,150	748	668,898	29·32	51·49	28,652	[illegible]
[illegible] ...	2,030,268	90,687	681	91,368	41·86	60·49	734	·38
North-W[illegible] ...	13,621,559	614,072**	25,575	639,647**	43·84	76·98	9,044	·75
Central P[illegible] ...	38,227,818	1,649,350(a)	55‖	1,649,405	39·19	40·98	22,204	·6
Madras [illegible] ...	180,607	10,250	232	10,482	50·68	12·15	38	·21
Coorg [illegible] ...	21,438,769	724,075¶	1,697	725,772¶	29·03	54·86	2,526	·14
Bombay [illegible] ...	10,477,508	382,326	14,087	396,413	31·77	21·07	1,298	·15
Burma [illegible] ...	476,912	12,801	...	12,801	26·13	52·90	863	1·81
Ajmer-Merwa[illegible] ...								
Total ...	233,999,437	8,932,120	191,242	9,123,362	35·93	43·87	170,694	·75

* For the calendar year.
§ Excluding 222,945 operations in the Tributary States, Orissa, received too late for inclusion.
‡ Including 2,568 secondary operations.
¶ Including 34 „ secondary operations.
† „ 16,010 persons enumerated at the Ajodhya Fair.
** „ 89 secondary operations.
(a) „ 23,150 „ „
‖ „ 1 „ „
¶ „ 1,158 „ „

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on 01 February, 2020